PREFERRED TYPE RANGE CATALOGUE 1989

Integrated Circuits, Discrete Semiconductors, Display Components, Passive Components, Professional Components, Materials.

Philips Components

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Preferred Type Range Catalogue 1989

Integrated circuits **IC**

Discrete semiconductors **S**

Electron tubes **E**

Capacitors **C**

Resistors **R**

Materials and other products **M**

Please note

The data appearing on pages S168 to S172 inclusive is incorrect. For correct information on these products please request a copy of publication no. 9398 353 30011 "Visible LEDs Product Survey" from your nearest Philips office listed on the back cover, or from the address below:

Philips Components Marketing Communications
Building BA, P.O. Box 218
5600 MD Eindhoven, The Netherlands
Attn.: Mr. A. van der Vlugt, Telex no. 35000 phtc nl

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PREFERRED TYPE RANGE CATALOGUE 1989

The preferred type range

Although Philips Components manufactures over 100 000 different products, only about a third of them regularly appears on the majority of customer orders.
This part of our total range is named the preferred type range. In this catalogue, type numbers, catalogue numbers, selection guides and brief technical data for the preferred type range are presented.

CECC approved products

Where information is available, products approved to the CECC (Cenelec Electronic Components Committee – harmonized system for electronic components of assessed quality) are listed at the end of each product section.

Status code

Within the preferred type range, status of products is indicated by code P (Preferred) or C (Common). Generally, these components can be supplied quickly.

Packaging quantities

With many products there is an indication of the packaging quantities; these units, or multiples of them, should be used when ordering.

The Philips Data Handbook System

For complete specifications of the components listed in this catalogue, please refer to the relevant volumes of the Philips Data Handbook System, which are indicated in the heading of each section in this catalogue.

The Philips Data Handbook System comprises over sixty volumes, divided into six series as follows:

Integrated circuits
Discrete semiconductors
Display components
Passive components
Professional components
Materials

The contents of these series are listed in the section entitled Data Handbook System at the end of this catalogue.

If you cannot find the information you need in this catalogue or the appropriate data handbook, please consult your nearest Philips Components sales organization or industrial distributor (for addresses, see the back cover of this catalogue).

How to use this catalogue

The 'Integrated circuits' and 'Discrete semiconductors' sections of this catalogue are also published separately under the titles 'Integrated circuits catalogue 1989' and 'Discrete semiconductors catalogue 1989' respectively.
The pages of this catalogue have, therefore, been numbered per section, as shown on the index pages.
To enable you to find the beginning of each section, thumbmarks have been provided.
There is a contents page at the beginning of each section, and all these contents pages have been combined into a general index at the beginning of the book (so the same contents list appears twice); we hope this facilitates the perusal of this catalogue.

Please note that all dimensions given in tables and drawings are in mm, unless stated otherwise.

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In the alphanumeric index (which appears in the second part of this section) reference is made to those IC data sheets or Data Handbooks in which comprehensive information is included.
These Handbooks are part of The Philips Data Handbook System which is a comprehensive source of information on electronic components, subassemblies and materials.
For this catalogue section the following Integrated Circuit Handbooks are of interest.

code	handbook title
IC01	Radio, audio and associated systems Bipolar, MOS
IC02a/b	Video and associated systems Bipolar, MOS
IC03	ICs for Telecom Bipolar, MOS Subscriber sets, Cordless telephones
IC04	HE4000B logic family CMOS
IC05	HE4000B logic family – uncased ICs CMOS
IC06	High–speed CMOS; PC74HC/HCT/HCU Logic family
IC07	not yet issued
IC08	ECL 10K and 100K logic families
IC09N	TTL logic series
IC10	Memories MOS, TTL, ECL
IC11	Linear products
Supplement to IC11	Linear products
IC12	I^{2}C–bus compatible ICs
IC13	Semi–custom Programmable Logic Devices (PLD)
IC14	Microcontrollers and peripherals Bipolar, MOS
IC15	FAST TTL logic series
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IC18	Microprocessors and peripherals
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CMOS HE4000B FAMILY SPECIFICATIONS

CMOS HE4000B FAMILY SPECIFICATIONS

The LOCMOS HE4000B range is a fully buffered digital integrated circuit family which meets the Jedec–B specification. The members of this family are plug–in replacements for the well–known CMOS 4000 and 14500 ranges.

The HE family has the same advantages as conventional CMOS circuits, plus the additional LOCMOS advantages.

Advantages of CMOS

- low power dissipation – typically 10 nW per gate (static)
- wide operating supply voltage range
- wide operating temperature ranges:
  −40 to +85 °C for standard temperature range (HEF)
  −55 to +125 °C for extended temperature range (HEC)
- high DC fan–out
- inputs and outputs are protected against electrostatic voltages

In addition to these, the **LOCMOS HE4000B** range has:

- buffered outputs on **all** circuits
- higher speed
- higher packing density – essential for MSI/LSI
- excellent noise immunity

Recommended supply voltage range 3 to 15 V.

LOCMOS means Local Oxidation Complementary MOS

Inputs and outputs are protected against electrostatic effects in a wide variety of device–handling situations. However, to be totally safe, handling precautions should be taken into account.

Type number designation

Type numbers have a suffix which signifies the type of package and burn–in option.

HE*4000**** complete type number which can be split up as follows:

HE* 4000 ** * *

B = burn–in

P = plastic DIL
T = plastic mini–pack (SO)
D = ceramic (cerdip) DIL
U = uncased chip

B = buffered
UB = unbuffered
V = limited operating voltage

F = T_{amb}: −40 to +85 °C
C = T_{amb}: −55 to +125 °C

CMOS HE4000B FAMILY SPECIFICATIONS (cont.)

The HE family is designed with standardized output drive characteristics which, combined with relative intensitivity to output capacitance loading, simplify system design.

Family ratings

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Supply voltage range	V_{DD} −0,5 to +18 V
Voltage on any input	V_I −0,5 to (V_{DD} +0,5) V
DC current into any input or output	±I max. 10 mA
Power dissipation per package:	
HEF (plastic and ceramic DIL)	
T_{amb} = −40 to +70 °C	P_{tot} max. 500 mW
T_{amb} = +70 to +85 °C	derate linearly by 8 mW/K
HEF (plastic SO mini–pack)	
T_{amb} = −40 to +70 °C	P_{tot} max. 400 mW
T_{amb} = +70 to +85 °C	derate linearly by 6 mW/K
HEC (ceramic DIL)	
T_{amb} = −55 to +70 °C	P_{tot} max. 500 mW
T_{amb} = +70 to +125 °C	derate linearly by 8 mW/K
Power dissipation per output	P max. 100 mW
Operating ambient temperature range	T_{amb} −40 to +85 °C
Storage temperature range	T_{stg} −65 to +150 °C
Operating ambient temperature range	
HEF	T_{amb} −55 to +85 °C
HEC	T_{amb} −55 to +125 °C

DC family characteristics for HEF at V_{SS} = 0 V

		T_{amb} = −40 °C		T_{amb} = +25 °C		T_{amb} = +85 °C		V_{DD}	
parameter	symbol	min.	max.	min.	max.	min.	max.	V	conditions
Quiescent device current for gates	I_{DD} (μA)	–	1.0	–	1.0	–	7.5	5	all valid input combinations; $V_I = V_{SS}$ or V_{DD}; $I_O = 0$
		–	2.0	–	2.0	–	15.0	10	
		–	4.0	–	4.0	–	30.0	15	
Quiescent device current for buffers and flip–flops	I_{DD} (μA)	–	4.0	–	4.0	–	30	5	all valid input combinations; $V_I = V_{SS}$ or V_{DD}; $I_O = 0$
		–	8.0	–	8.0	–	60	10	
		–	16.0	–	16.0	–	120	15	
Quiescent device current for MSI	I_{DD} (μA)	–	20	–	20	–	150	5	all valid input combinations; $V_I = V_{SS}$ or V_{DD}; $I_O = 0$
		–	40	–	40	–	300	10	
		–	80	–	80	–	600	15	

DC family characteristicsfor HEF at $V_{SS} = 0$ (cont.)

parameter	symbol	$T_{amb} = -40$ °C min.	$T_{amb} = -40$ °C max.	$T_{amb} = +25$ °C min.	$T_{amb} = +25$ °C max.	$T_{amb} = +85$ °C min.	$T_{amb} = +85$ °C max.	V_{DD} V	conditions
Quiescent device current for LSI	I_{DD} (µA)	–	50	–	50	–	375	5	all valid input combinations; $V_I = V_{SS}$ or V_{DD}; $I_O = 0$
		–	100	–	100	–	750	10	
		–	200	–	200	–	1500	15	
Output voltage LOW $\lvert i_O \rvert < 1$ µA	V_{OL} (V)	–	0.05	–	0.05	–	0.05	5	$V_I = V_{SS}$ or V_{DD}
		–	0.05	–	0.05	–	0.05	10	$V_I = V_{SS}$ or V_{DD}
		–	0.05	–	0.05	–	0.05	15	$V_I = V_{SS}$ or V_{DD}
Output voltage HIGH $\lvert I_O \rvert < 1$ µA	V_{OH} (V)	4.95	–	4.95	–	4.95	–	5	$V_I = V_{SS}$ or V_{DD}
		9.95	–	9.95	–	9.95	–	10	$V_I = V_{SS}$ or V_{DD}
		14.95	–	14.95	–	14.95	–	15	$V_I = V_{SS}$ or V_{DD}
Input voltage LOW $\lvert I_O \rvert < 1$ µA (buffered stages only)	V_{IL} (V)	–	1.5	–	1.5	–	1.5	5	$V_O = 0.5$ or 4.5 V
		–	3.0	–	3.0	–	3.0	10	$V_O = 1.0$ or 9.0 V
		–	4.0	–	4.0	–	4.0	15	$V_O = 1.5$ or 13.5 V
Input voltage HIGH $\lvert I_O \rvert < 1$ µA (buffered stages only)	V_{IH} (V)	3.5	–	3.5	–	3.5	–	5	$V_O = 0.5$ or 4.5 V
		7.0	–	7.0	–	7.0	–	10	$V_O = 1.0$ or 9.0 V
		11.0	–	11.0	–	11.0	–	15	$V_O = 1.5$ or 13.5 V
Input voltage LOW $\lvert I_O \rvert < 1$ µA (unbuffered stages only)	V_{IL} (V)	–	1.0	–	1.0	–	1.0	5	$V_O = 0.5$ or 4.5 V
		–	2.0	–	2.0	–	2.0	10	$V_O = 1.0$ or 9.0 V
		–	2.5	–	2.5	–	2.5	15	$V_O = 1.5$ or 13.5 V
Input voltage HIGH $\lvert I_O \rvert < 1$ µA (unbuffered stages only)	V_{IH} (V)	4.0	–	4.0	–	4.0	–	5	$V_O = 0.5$ or 4.5 V
		8.0	–	8.0	–	8.0	–	10	$V_O = 1.0$ or 9.0 V
		12.5	–	12.5	–	12.5	–	15	$V_O = 1.5$ or 13.5 V
Output (sink) current LOW	I_{OL} (mA)	0.52	–	0.44	–	0.36	–	5	$V_O = 0.4$; $V_I = 0/5$ V
		1.3	–	1.1	–	0.9	–	10	$V_O = 0.5$; $V_I = 0/10$ V
		3.6	–	3.0	–	2.4	–	15	$V_O = 1.5$; $V_I = 0/15$ V
Output (source) current HIGH	$-I_{OH}$ (mA)	0.52	–	0.44	–	0.36	–	5	$V_O = 4.6$; $V_I = 0/5$ V
		1.3	–	1.1	–	0.9	–	10	$V_O = 9.5$; $V_I = 0/10$ V
		3.6	–	3.0	–	2.4	–	15	$V_O = 13.5$; $V_I = 0/15$ V
Output (source) current (HIGH)	$-I_{OH}$ (mA)	1.7	–	1.4	–	1.1	–	5	$V_O = 2.5$; $V_I = 0/5$ V
Input leakage current	$\pm I_{IN}$(µA)	–	0.3	–	0.3	–	1.0	15	$V_I = 0$ or 15 V
3–state output leakage current HIGH	I_{OZH} (µA)	–	1.6	–	1.6	–	12.0	15	output returned to V_{DD}
3–state output leakage current LOW	$-I_{OZL}$ (µA)	–	1.6	–	1.6	–	12.0	15	output returned to V_{SS}
Input capacitance per unit load	C_I (pF)	–	–	–	7.5	–	–	–	digital inputs

DC family characteristics for HEC at $V_{SS} = 0$ V

		$T_{amb} = -55$ °C		$T_{amb} = +25$ °C		$T_{amb} = +125$ °C		V_{DD}	
parameter	symbol	min.	max.	min.	max.	min.	max.	V	conditions
Quiescent device current for gates	I_{DD} (μA)	–	0.25	–	0.25	–	7.5	5	all valid input combinations; $V_I = V_{SS}$ or V_{DD}; $I_O = 0$
		–	0.5	–	0.5	–	15.0	10	
		–	1.0	–	1.0	–	30.0	15	
Quiescent device current for buffers and flip–flops	I_{DD} (μA)	–	1.0	–	1.0	–	30	5	all valid input combinations; $V_I = V_{SS}$ or V_{DD}; $I_O = 0$
		–	2.0	–	2.0	–	60	10	
		–	4.0	–	4.0	–	120	15	
Quiescent device current for MSI	I_{DD} (μA)	–	5.0	–	5.0	–	150	5	all valid input combinations; $V_I = V_{SS}$ or V_{DD}; $I_O = 0$
		–	10.0	–	10.0	–	300	10	
		–	20.0	–	20.0	–	600	15	
Quiescent device current for LSI	I_{DD} (μA)	–	15	–	15	–	375	5	all valid input combinations; $V_I = V_{SS}$ or V_{DD}; $I_O = 0$
		–	25	–	25	–	750	10	
		–	50	–	50	–	1500	15	
Output voltage LOW $\lvert I_O \rvert < 1$ μA	V_{OL} (V)	–	0.05	–	0.05	–	0.05	5	$V_I = V_{SS}$ or V_{DD}
		–	0.05	–	0.05	–	0.05	10	$V_I = V_{SS}$ or V_{DD}
		–	0.05	–	0.05	–	0.05	15	$V_I = V_{SS}$ or V_{DD}
Output voltage HIGH $\lvert I_O \rvert < 1$ μA	V_{OH} (V)	4.95	–	4.95	–	4.95	–	5	$V_I = V_{SS}$ or V_{DD}
		9.95	–	9.95	–	9.95	–	10	$V_I = V_{SS}$ or V_{DD}
		14.95	–	14.95	–	14.95	–	15	$V_I = V_{SS}$ or V_{DD}
Input voltage LOW $\lvert I_O \rvert < 1$ μA (buffered stages only)	V_{IL} (V)	–	1.5	–	1.5	–	1.5	5	$V_O = 0.5$ or 4.5 V
		–	3.0	–	3.0	–	3.0	10	$V_O = 1.0$ or 9.0 V
		–	4.0	–	4.0	–	4.0	15	$V_O = 1.5$ or 13.5 V
Input voltage HIGH $\lvert I_O \rvert < 1$ μA (buffered stages only)	V_{IH} (V)	3.5	–	3.5	–	3.5	–	5	$V_O = 0.5$ or 4.5 V
		7.0	–	7.0	–	7.0	–	10	$V_O = 1.0$ or 9.0 V
		11.0	–	11.0	–	11.0	–	15	$V_O = 1.5$ or 13.5 V

DC family characteristicsfor HEC at $V_{SS} = 0$ (cont.)

parameter	symbol	$T_{amb} = -55$ °C min.	$T_{amb} = -55$ °C max.	$T_{amb} = +25$ °C min.	$T_{amb} = +25$ °C max.	$T_{amb} = +125$ °C min.	$T_{amb} = +125$ °C max.	V_{DD} V	conditions
Input voltage LOW $\lvert I_O \rvert < 1\ \mu A$ (unbuffered stages only)	V_{IL} (V)	–	1.0	–	1.0	–	1.0	5	$V_O = 0.5$ or 4.5 V
		–	2.0	–	2.0	–	2.0	10	$V_O = 1.0$ or 9.0 V
		–	2.5	–	2.5	–	2.5	15	$V_O = 1.5$ or 13.5 V
Input voltage HIGH $\lvert I_O \rvert < 1\ \mu A$ (unbuffered stages only)	V_{IH} (V)	4.0	–	4.0	–	4.0	–	5	$V_O = 0.5$ or 4.5 V
		8.0	–	8.0	–	8.0	–	10	$V_O = 1.0$ or 9.0 V
		12.5	–	12.5	–	12.5	–	15	$V_O = 1.5$ or 13.5 V
Output (sink) current LOW	I_{OL} (mA)	0.64	–	0.5	–	0.36	–	5	$V_O = 0.4$; $V_I = 0/5$ V
		1.6	–	1.3	–	0.9	–	10	$V_O = 0.5$; $V_I = 0/10$ V
		4.2	–	3.4	–	2.4	–	15	$V_O = 1.5$; $V_I = 0/15$ V
Output (source) current HIGH	$-I_{OH}$ (mA)	0.64	–	0.5	–	0.36	–	5	$V_O = 4.6$; $V_I = 0/5$ V
		1.6	–	1.3	–	0.9	–	10	$V_O = 9.5$; $V_I = 0/10$ V
		4.2	–	3.4	–	2.4	–	15	$V_O = 13.5$; $V_I = 0/15$ V
Output (source) current (HIGH)	$-I_{OH}$ (mA)	1.7	–	1.4	–	1.1	–	5	$V_O = 2.5$; $V_I = 0/5$ V
Input leakage current	$\pm I_{IN}$ (μA)	–	0.3	–	0.3	–	1.0	15	$V_I = 0$ or 15 V
3–state output leakage current HIGH	I_{OZH} (μA)	–	1.6	–	1.6	–	12.0	15	output returned to V_{DD}
3–state output leakage current LOW	$-I_{OZL}$ (μA)	–	1.6	–	1.6	–	12.0	15	output returned to V_{SS}
Input capacitance per unit load	C_I (pF)	–	–	–	7.5	–	–	–	digital inputs

CMOS HE4000B FAMILY SURVEY

Type numbers have a suffix which signifies the type of package and burn–in option:
P = plastic DIL; D = ceramic (cerdip) DIL; T = plastic SO mini–pack;
U = uncased chip; 2nd B = burn–in

HE4000B FAMILY		HEF	HEC
ARITHMETIC ICs			
4008B	4–bit binary full adder	●	
4531B	13–input parity checker/generator	●	
BUFFERS			
4007UB	dual complementary pair and inverter	●	●
4041B	quadruple true/complement buffer	●	
4049B	hex inverting buffers	●	●
4050B	hex non–inverting buffers	●	●
4502B	strobed hex inverter/buffer	●	
40097B	3–state hex non–inverting buffer	●	●
40098B	3–state hex inverting buffer	●	●
40240B	octuple buffers with 3–state outputs	●	
40244B	octuple buffers with 3–state outputs	●	
BUS ICs			
40245B	octuple bus transceiver with 3–state outputs	●	
COMPARATORS			
4585B	4–bit magnitude comparator	●	●
COUNTERS			
4017B	5–stage Johnson counter	●	●
4018B	presettable divide–by–n counter	●	
4020B	14–stage binary counter	●	●
4022B	4–stage divide–by–8 Johnson counter	●	
4024B	7–stage binary counter	●	●
4029B	synchronous up/down counter, binary/decade counter	●	
4040B	12–stage binary counter	●	●
4059B	programmable divide–by–n counter	●	
4060B	14–stage ripple–carry binary counter/divider and oscillator	●	
4510B	BCD up/down counter	●	●
4516B	binary up/down counter	●	
4518B	dual BCD counter	●	
4520B	dual binary counter	●	●
4521B	24–stage frequency divider	●	
4522B	programmable 4–bit BCD down counter	●	
4526B	programmable 4–bit binary down counter	●	
4534B	real time 5–decade counter	●	
4737B	quadruple static decade counter	●	
4737V	quadruple static decade counter	●	
4751V	universal divider	●	●
40160B	4–bit synchronous decade counter; asynchronous reset	●	
40161B	4–bit synchronous binary counter; asynchronous reset	●	

HE4000B FAMILY		HEF	HEC
COUNTERS (cont.)			
40162B	4–bit synchronous decade counter; synch. reset		
40163B	4–bit synchronous binary counter; synch. reset		
40192B	4–bit up/down decade counter	●	
40193B	4–bit up/down binary counter	●	
DECODERS			
4028B	1–of–10 decoder	●	
4511B	BCD to 7–segment latch/decoder/driver	●	●
4514B	1–of–16 decoder/demultiplexer with input latches	●	
4515B	1–of–16 decoder/demultiplexer with input latches	●	
4543B	BCD to 7–segment latch/decoder/driver	●	
4555B	dual 1–of–4 decoder/demultiplexer	●	
4556B	dual 1–of–4 decoder/demultiplexer	●	●
DEMULTIPLEXERS			
4051B	8–channel analogue multiplexer/demultiplexer	●	●
4052B	dual 4–channel analogue multiplexer/demultiplexer	●	
4053B	triple 2–channel analogue multiplexer/demultiplexer	●	
4067B	16–channel analogue multiplexer/demultiplexer	●	
4514B	1–of–16 decoder/demultiplexer with input latches	●	
4515B	1–of–16 decoder/demultiplexer with input latches	●	
4555B	dual 1–of–4 decoder/demultiplexer	●	
4556B	dual 1–of–4 decoder/demultiplexer	●	●
DRIVERS			
4511B	BCD to 7–segment latch/decoder/driver	●	●
4543B	BCD to 7–segment latch/decoder/driver	●	
ENCODERS			
4532B	8–input priority encoder	●	
FLIP–FLOPS			
D–type			
4013B	dual D–type flip–flop	●	●
40174B	hex D–type flip–flop	●	●
40175B	quadruple D–type flip–flop	●	●
40374B	octuple D–type flip–flop with 3–state outputs	●	
JK			
4027B	dual JK flip–flop	●	●
GATES			
AND			
4073B	triple 3–input AND gate	●	●
4081B	quadruple 2–input AND gate	●	●

HE4000B FAMILY — HEF HEC

GATES (cont.)

AND (cont.)

		HEF	HEC
4082B	dual 4–input AND gate	●	
4085B	dual 2–wide 2–input AND–OR–invert gate	●	
4086B	4–wide 2–input AND–OR–invert gate	●	

Complex

		HEF	HEC
4030B	quadruple EXCLUSIVE–OR gate	●	●
4070B	quadruple EXCLUSIVE–OR gate	●	●
4077B	quadruple EXCLUSIVE–NOR gate	●	
4085B	dual 2–wide 2–input AND–OR–invert gate	●	
4086B	4–wide 2–input AND–OR–invert gate	●	

EXCLUSIVE–OR

		HEF	HEC
4030B	quadruple EXCLUSIVE–OR gate	●	●
4070B	quadruple EXCLUSIVE–OR gate	●	●

EXCLUSIVE–NOR

		HEF	HEC
4077B	quadruple EXCLUSIVE–NOR gate	●	

Inverter

		HEF	HEC
4085B	dual 2–wide 2–input AND–OR–invert gate	●	
4086B	4–wide 2–input AND–OR–invert gate	●	

NAND

		HEF	HEC
4011B	quadruple 2–input NAND gate	●	●
4011UB	quadruple 2–input NAND gate; unbuffered	●	
4012B	dual 4–input NAND gate	●	●
4023B	triple 3–input NAND gate	●	●
4068B	8–input NAND gate	●	●

NOR

		HEF	HEC
4000B	dual 3–input NOR gate and inverter	●	
4001B	quadruple 2–input NOR gate	●	●
4001UB	quadruple 2–input NOR gate; unbuffered	●	
4002B	dual 4–input NOR gate	●	●
4025B	triple 3–input NOR gate	●	●
4078B	8–input NOR gate	●	

OR

		HEF	HEC
4071B	quadruple 2–input OR gate	●	●
4072B	dual 4–input OR gate	●	
4075B	triple 3–input OR gate	●	
4085B	dual 2–wide 2–input AND–OR–invert gate	●	
4086B	4–wide 2–input AND–OR–invert gate	●	

HE4000B FAMILY		HEF	HEC
INVERTERS			
4007UB	dual complementary pair and inverter	●	●
4069UB	hex inverter	●	●
4502B	strobed hex inverter/buffer	●	
LATCHES			
4042B	quadruple D–latch	●	●
4043B	quadruple R/S latch with 3–state outputs	●	
4044B	quadruple R/S latch with 3–state outputs	●	
4508B	dual 4–bit latch	●	
4511B	BCD to 7–segment latch/decoder/driver	●	
4543B	BCD to 7–segment latch/decoder/driver	●	
4724B	8–bit addressable latch	●	
40373B	octuple transparent latch with 3–state output	●	
MEMORIES			
4505B	64–bit, 1–bit per word static read/write RAM	●	●
4720B	256–bit, 1–bit per word RAM	●	
4720V	256–bit, 1–bit per word RAM	●	
MULTIPLEXERS			
4019B	quadruple 2–input multiplexer	●	●
4051B	8–channel analogue multiplexer/demultiplexer	●	●
4052B	dual 4–channel analogue multiplexer/demultiplexer	●	
4053B	triple 2–channel analogue multiplexer/demultiplexer	●	
4067B	16–channel analogue multiplexer/demultiplexer	●	
4512B	8–input multiplexer with 3–state output	●	●
4519B	quadruple 2–input multiplexer	●	●
4539B	dual 4–input multiplexer	●	●
MULTIVIBRATORS			
Astable			
4047B	monostable/astable multivibrator	●	●
Monostable			
4047B	monostable/astable multivibrator	●	●
4528B	dual monostable multivibrator	●	●
4538B	dual precision monostable multivibrator	●	

HE4000B FAMILY		HEF	HEC
REGISTERS			
4006B	18–stage static shift register	●	
4014B	8–bit static shift register	●	●
4015B	dual 4–bit static shift register	●	●
4021B	8–bit static shift register	●	
4031B	64–stage static shift register	●	
4035B	4–bit universal shift register	●	●
4076B	quadruple D–type register with 3–state outputs	●	
4094B	8–stage shift–and–store bus register	●	●
4517B	dual 64–bit static shift register	●	
4557B	1–to–64 bit variable length shift register	●	●
4731B	quadruple 64–bit static shift register	●	
4731V	quadruple 64–bit static shift register	●	
40194B	4–bit bidirectional universal shift register	●	●
40195B	4–bit universal shift register	●	●
SCHMITT TRIGGERS			
4093B	quadruple 2–input NAND Schmitt trigger	●	●
40106B	hex inverting Schmitt trigger	●	
SPECIAL FUNCTIONS			
4046B	phase–locked loop	●	
4104B	quadruple low–to–high voltage translator with 3–state outputs	●	
4527B	BCD rate multiplier	●	
4738V	IEC/IEEE bus interface	●	
4750V	frequency synthesizer	●	●
4752V	AC motor control circuit	●	
4754V	18–element bar graph LCD driver	●	
4755V	transceiver for serial data communication	●	
SWITCHES			
4016B	quadruple bilateral switches	●	●
4066B	quadruple bilateral switches	●	●
TIMING CIRCUITS			
4541B	programmable timer	●	●
4753B	universal timer module	●	
4753V	universal timer module	●	

HCMOS PC74 FAMILY SPECIFICATIONS

General

These specifications cover the electrical ratings and characteristics that are common to the entire HCMOS PC74 family, unless otherwise specified in the data sheet of an individual device.

Introduction

The HCMOS family of logic ICs is manufactured using a self–aligning 3 µm polycrystalline silicon–gate CMOS process combined with local oxidation of silicon (LOCOS). HCMOS ICs have the low power consumption, high immunity to input noise and wide operating temperature range of earlier silicon–gate CMOS circuits together with the high–speed and drive capability of bipolar, low–power Schottky TTL (LSTTL). They are also immune to latch–up and all types are available in DIL packages and in space–saving SO packages.

Many HCMOS circuits are pin–compatible with existing 54/74 LSTTL and HE4000B CMOS logic ICs. HCT types are ideal replacements for LSTTL. HCT types can also interface between TTL and CMOS ICs.

Three types of HCMOS ICs are available:

74HC	CMOS input switching levels 30%V_{CC} and 70%V_{CC} (typical switching threshold 50%V_{CC}), supply voltage 2 V to 6 V
74HCT	TTL input switching levels 0,8 V and 2 V (typical switching threshold 28%V_{CC}), supply voltage 5 V ± 10%
74HCU	CMOS input switching levels 20%V_{CC} and 80%V_{CC} (typical switching threshold 50%V_{CC}), supply voltage 2 V to 6 V; unbuffered to allow operation in the linear mode

The HCMOS family also includes several complex circuits for switching or multiplexing analog signals. These circuits have low crosstalk and feedthrough, and a very large frequency bandwidth. There are also two FIFOs and two PLLs in the HCMOS range, of which one (HC/HCT297) is a fully digital type.

Handling MOS devices

Inputs and outputs are protected against electrostatic effects in a wide variety of device–handling situations. However, to be totally safe, it is desirable to take handling precautions into account.

HCMOS features

- Very low power dissipation
- The switching levels of 74HC types are 30% and 70% of V_{CC}
- DC noise margin of 74HC types three times that of TTL ICs
- Logic output levels 0,1 V and V_{CC} – 0,1 V
- All types, except 74HCU are fully buffered
- Typical gate propogation delay of 8 ns
- Can operate up to 60 MHz (typical)
- Fanout capability of 10 LSTTL loads (4 mA); this is increased to 15 LSTTL loads (6 mA) for types with bus–driver outputs
- Wide supply voltage range
- Latch–up free
- Inputs protected against electrostatic discharge
- Functions and pinning identical to most popular LSTTL and CMOS HE4000B families
- Analog switching types operating up to 10 V
- Symmetrical output sourcing and sinking currents and equal output rise and fall times
- All types available in plastic SO packages for surface mounting and plastic DIL packages
- Choice of operating temperature range: –40 to +85 °C or –40 to +125 °C
- Approved to JEDEC standard No. 7A
- Alternate source is RCA

Type number designation

Basic family:

PC74*** ***** * complete type number; standard and extended temperature ranges

PC74*** ***** *

	package code:
P	= plastic DIL;
T	= plastic mini–pack (SO)
	device number (up to 5 digits)
HC	= CMOS input switching levels; supply voltage range 2 to 6 V; fully buffered
HCT	= TTL input switching levels; supply voltage range 5 V ± 10%; fully buffered
HCU	= CMOS input switching levels; supply voltage range 2 to 6 V; unbuffered (single–stage devices)

Family ratings

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Voltages are referenced to GND (ground = 0 V)

parameter	conditions	symbol	min.	max.	unit
DC supply voltage		V_{CC}	-0.5	$+7$	V
DC input diode current	for $V_I < -0.5$ V or $V_I > V_{CC}+0.5$ V	$\pm I_{IK}$	–	20	mA
DC output diode current	for $V_O < -0.5$ V or $V_O > V_{CC}+0.5$ V	$\pm I_{OK}$	–	20	mA
DC output source or sink current	for $-0.5\ V < V_O < V_{CC}+0.5\ V$				
	standard outputs	$\pm I_O$	–	25	mA
	bus driver outputs	$\pm I_O$	–	35	mA
DC V_{CC} or GND current	standard outputs	$\pm I_{CC}$; $\pm I_{GND}$	–	50	mA
	bus driver outputs	$\pm I_{CC}$; $\pm I_{GND}$	–	70	mA
Storage temperature range		T_{stg}	-65	$+150$	°C
Power dissipation per package	for temperature range; −40 to +125 °C; PC74HC/HCT/HCU				
plastic DIL	above +70 °C derate linearly by 12 mW/K	P_{tot}	–	750	mW
plastic mini–pack (SO)	above +70 °C derate linearly by 8 mW/K	P_{tot}	–	500	mW

Recommended operating conditions

Voltages are referenced to GND (ground = 0 V)

parameter	symbol	min.	typ.	max.	unit	conditions
DC supply voltage range						
PC74HC/HCU	V_{CC}	2.0	5.0	6.0	V	
PC74HCT	V_{CC}	4.5	5.0	5.5	V	
DC input voltage range	V_I	0	–	V_{CC}	V	
DC output voltage range	V_O	0	–	V_{CC}	V	
Operating ambient temperature range						
PC74HC/HCT/HCU	T_{amb}	−40	–	+85	°C	standard
PC74HC/HCT/HCU	T_{amb}	−40	–	+125	°C	extended
Input rise and fall times		–	–	1000	ns	V_{CC} = 2.0 V
except for Schmitt trigger inputs	t_r; t_f	–	6.0	500	ns	V_{CC} = 4.5 V
		–	–	400	ns	V_{CC} = 6.0 V

DC family characteristics, PC74HC

Voltages are referenced to GND (ground = 0 V)

	V_{CC}		T_{amb} (°C)								conditions	
			+25			−40 to +85		−40 to +125				
parameter	V	symbol	min.	typ.	max.	min.	max.	min.	max.	unit	V_I	other
HIGH level input voltage	2.0	V_{IH}	1.5	1.2	–	1.5	–	1.5	–	V		
	4.5		3.15	2.4	–	3.15	–	3.15	–	V		
	6.0		4.2	3.2	–	4.2	–	4.2	–	V		
LOW level input voltage	2.0	V_{IL}	–	0.8	0.5	–	0.5	–	0.5	V		
	4.5		–	2.1	1.35	–	1.35	–	1.35	V		
	6.0		–	2.8	1.8	–	1.8	–	1.8	V		
HIGH level output voltage all outputs	2.0	V_{OH}	1.9	2.0	–	1.9	–	1.9	–	V	V_{IH}	$-I_O = 20\ \mu A$
	4.5		4.4	4.5	–	4.4	–	4.4	–	V	or	$-I_O = 20\ \mu A$
	6.0		5.9	6.0	–	5.9	–	5.9	–	V	V_{IL}	$-I_O = 20\ \mu A$
HIGH level output voltage standard	4.5	V_{OH}	3.98	4.32	–	3.84	–	3.7	–	V	V_{IH}	$-I_O = 4.0$ mA
	6.0		5.48	5.81	–	5.34	–	5.2	–	V	or V_{IL}	$-I_O = 5.2$ mA
HIGH level output voltage bus driver	4.5	V_{OH}	3.98	4.32	–	3.84	–	3.7	–	V	V_{IH}	$-I_O = 6.0$ mA
	6.0		5.48	5.81	–	5.34	–	5.2	–	V	or V_{IL}	$-I_O = 7.8$ mA
LOW level output voltage all outputs	2.0	V_{OL}	–	0	0.1	–	0.1	–	0.1	V	V_{IH}	$I_O = 20\ \mu A$
	4.5		–	0	0.1	–	0.1	–	0.1	V	or	$I_O = 20\ \mu A$
	6.0		–	0	0.1	–	0.1	–	0.1	V	V_{IL}	$I_O = 20\ \mu A$
LOW level output voltage standard	4.5	V_{OL}	–	0.15	0.26	–	0.33	–	0.4	V	V_{IH}	$I_O = 4.0$ mA
	6.0		–	0.16	0.26	–	0.33	–	0.4	V	or V_{IL}	$I_O = 5.2$ mA
LOW level output voltage bus driver	4.5	V_{OL}	–	0.15	0.26	–	0.33	–	0.4	V	V_{IH}	$I_O = 6.0$ mA
	6.0		–	0.16	0.26	–	0.33	–	0.4	V	or V_{IL}	$I_O = 7.8$ mA
Input leakage current	6.0	$\pm I_I$	–	–	0.1	–	1.0	–	1.0	μA	V_{CC} or GND	
3–state OFF–state current	6.0	$\pm I_{OZ}$	–	–	0.5	–	5.0	–	10.0	μA	V_{IH} or V_{IL}	$V_O = V_{CC}$ or GND
Quiescent supply current												
SSI	6.0	I_{CC}	–	–	2.0	–	20.0	–	40.0	μA	V_{CC}	$I_O = 0$
flip–flops	6.0	I_{CC}	–	–	4.0	–	40.0	–	80.0	μA	or	$I_O = 0$
MSI	6.0	I_{CC}	–	–	8.0	–	80.0	–	160.0	μA	GND	$I_O = 0$
LSI	6.0	I_{CC}	–	–	50.0	–	500.0	–	1000.0	μA	GND	$I_O = 0$

DC family characteristics, PC74HCU

Voltages are referenced to GND (ground = 0 V)

	V_{CC}		T_{amb} (°C)								conditions	
			+25			−40 to +85		−40 to +125				
parameter	V	symbol	min.	typ.	max.	min.	max.	min.	max.	unit	V_I	other
HIGH level input voltage	2.0	V_{IH}	1.7	1.4	–	1.7	–	1.7	–	V		
	4.5		3.6	2.6	–	3.6	–	3.6	–	V		
	6.0		4.8	3.4	–	4.8	–	4.8	–	V		
LOW level input voltage	2.0	V_{IL}	–	0.6	0.3	–	0.3	–	0.3	V		
	4.5		–	1.9	0.9	–	0.9	–	0.9	V		
	6.0		–	2.6	1.2	–	1.2	–	1.2	V		
HIGH level output voltage	2.0	V_{OH}	1.8	2.0	–	1.8	–	1.8	–	V	V_{IH} or V_{IL}	$-I_O = 20\ \mu A$
	4.5		4.0	4.5	–	4.0	–	4.0	–	V		$-I_O = 20\ \mu A$
	6.0		5.5	6.0	–	5.5	–	5.5	–	V		$-I_O = 20\ \mu A$
HIGH level output voltage	4.5	V_{OH}	3.98	4.32	–	3.84	–	3.7	–	V	V_{CC} or GND	$-I_O = 4.0$ mA
	6.0		5.48	5.81	–	5.34	–	5.2	–	V		$-I_O = 5.2$ mA
LOW level output voltage	2.0	V_{OL}	–	0	0.2	–	0.2	–	0.2	V	V_{IH} or V_{IL}	$I_O = 20\ \mu A$
	4.5		–	0	0.5	–	0.5	–	0.5	V		$I_O = 20\ \mu A$
	6.0		–	0	0.5	–	0.5	–	0.5	V		$I_O = 20\ \mu A$
LOW level output voltage	4.5	V_{OL}	–	0.15	0.26	–	0.33	–	0.4	V	V_{CC} or GND	$I_O = 4.0$ mA
	6.0		–	0.16	0.26	–	0.33	–	0.4	V		$I_O = 5.2$ mA
Input leakage current	6.0	$\pm I_I$	–	–	0.1	–	1.0	–	1.0	μA	V_{CC} or GND	
Quiescent supply current **SSI**	6.0	I_{CC}	–	–	2.0	–	20.0	–	40.0	μA	V_{CC} or GND	$I_O = 0$

DC family characteristics, PC74HCT

Voltages are referenced to GND (ground = 0 V)

			T_{amb} (°C)									
	V_{CC}		+25			−40 to +85		−40 to +125			conditions	
parameter	V	sym–bol	min.	typ.	max.	min.	max.	min.	max.	unit	V_I	other
HIGH level input voltage	4.5–5.5	V_{IH}	2.0	1.6	–	2.0	–	2.0	–	V		
LOW level input voltage	4.5–5.5	V_{IL}	–	1.2	0.8	–	0.8	–	0.8	V		
HIGH level output voltage all outputs	4.5	V_{OH}	4.4	4.5	–	4.4	–	4.4	–	V	V_{IH} or V_{IL}	$-I_O = 20\ \mu A$
HIGH level output voltage standard	4.5	V_{OH}	3.98	4.32	–	3.84	–	3.7	–	V	V_{IH} or V_{IL}	$-I_O = 4.0$ mA
HIGH level output voltage bus driver	4.5	V_{OH}	3.98	4.32	–	3.84	–	3.7	–	V	V_{IH} or V_{IL}	$-I_O = 6.0$ mA
LOW level output voltage all outputs	4.5	V_{OL}	–	0	0.1	–	0.1	–	0.1	V	V_{IH} or V_{IL}	$I_O = 20\ \mu A$
LOW level output voltage standard	4.5	V_{OL}	–	0.15	0.26	–	0.33	–	0.4	V	V_{IH} or V_{IL}	$I_O = 4.0$ mA
LOW level output voltage bus driver	4.5	V_{OL}	–	0.16	0.26	–	0.33	–	0.4	V	V_{IH} or V_{IL}	$I_O = 6.0$ mA
Input leakage current	5.5	$\pm I_I$	–	–	0.1	–	1.0	–	1.0	μA	V_{CC} or GND	
3–state OFF–state current	5.5	$\pm I_{OZ}$	–	–	0.5	–	5.0	–	10.0	μA	V_{IH} or V_{IL}	$V_O = V_{CC}$ or GND; per input pin; other inputs at V_{CC} or GND; $I_o = 0$
Quiescent supply current												
SSI	5.5	I_{CC}	–	–	2.0	–	20.0	–	40.0	μA	V_{CC}	$I_O = 0$
flip–flops	5.5	I_{CC}	–	–	4.0	–	40.0	–	80.0	μA	or	$I_O = 0$
MSI	5.5	I_{CC}	–	–	8.0	–	80.0	–	160.0	μA	GND	$I_O = 0$
LSI	5.5	I_{CC}	–	–	50.0	–	500.0	–	1000.0	μA	GND	$I_O = 0$
A.Q.S.C. (see note)	4.5–5.5	ΔI_{CC}	–	100	360	–	450	–	490	μA	V_{CC} –2,1 V	other inputs at V_{CC} or GND $I_O = 0$

Note: Additional quiescent supply current (A.Q.S.C.) per input pin for unit load coefficient is 1.*

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* The additional quiescent supply current per input is determined by the ΔI_{CC} unit load, which has to be multiplied by the unit load coefficient as given in the individual data sheets. For dual supply systems the theoretical worst–case ($V_I = 2.4$; $V_{CC} = 5.5$ V) specification is: $\Delta I_{CC} = 0.65$ mA (typical) and 1.8 mA (maximum) across temperature.

AC family characteristics

GND = 0 V; C_L = 50 pF; t_r = t_f = 6 ns

PC74HC

			T_{amb} (°C)							
	V_{CC}		+25			−40 to +85		−40 to +125		
parameter	V	symbol	min.	typ.	max.	min.	max.	min.	max.	unit
Output transition time standard outputs	2.0	t_{THL}/ t_{TLH}	–	19	75	–	95	–	110	ns
	4.5		–	7	15	–	19	–	22	ns
	6.0		–	6	13	–	16	–	19	ns
Output transition time bus driver outputs	2.0	t_{THL} t_{TLH}	–	14	60	–	75	–	90	ns
	4.5		–	5	12	–	15	–	18	ns
	6.0		–	4	10	–	13	–	15	ns

PC74HCU

			T_{amb} (°C)							
	V_{CC}		+25			−40 to +85		−40 to +125		
parameter	V	symbol	min.	typ.	max.	min.	max.	min.	max.	unit
Output transition time	2.0	t_{THL} t_{TLH}	–	19	75	–	95	–	110	ns
	4.5		–	7	15	–	19	–	22	ns
	6.0		–	6	13	–	16	–	19	ns

PC74HCT

			T_{amb} (°C)							
	V_{CC}		+25			−40 to +85		−40 to +125		
parameter	V	symbol	min.	typ.	max.	min.	max.	min.	max.	unit
Output transition time standard outputs	4.5	t_{THL}/ t_{TLH}	–	7	15	–	19	–	22	ns
Output transition time bus driver outputs	4.5	t_{THL}/ t_{TLH}	–	5	12	–	15	–	18	ns

HCMOS PC74 FAMILY SURVEY

Type numbers have a suffix which signifies the type of package:
P = plastic DIL; T = plastic SO mini-pack

PC74 FAMILY		HC	HCT
ARITHMETIC ICs			
181	4-bit arithmetic logic unit	●	●
182	look-ahead carry generator	●	●
280	9-bit odd/even parity generator/checker	●	●
283	4-bit binary full adder with fast carry	●	●
583	4-bit full adder with fast carry	●	●
7080	16-bit even/odd parity generator/checker	●	●
BUFFERS/LINE DRIVERS			
125	quad buffer/line driver; 3-state; output enable active LOW	●	●
126	quad buffer/line driver; 3-state; output enable active HIGH	●	●
240	octal buffer/line driver; 3-state; inverting	●	●
241	octal buffer/line driver; 3-state; output enable active low or HIGH	●	●
244	octal buffer/line driver; 3-state; output enable active LOW	●	●
365	hex buffer/line driver; 3-state	●	●
366	hex buffer/line driver; 3-state; inverting	●	●
367	hex buffer/line driver; 3-state	●	●
368	hex buffer/line driver; 3-state; inverting	●	●
540	octal buffer/line driver; 3-state; inverting	●	●
541	octal buffer/line driver; 3-state	●	●
7540	octal Schmitt trigger buffer/line driver; 3-state; inverting	●	●
7541	octal Schmitt trigger buffer/line driver; 3-state	●	●
9014	nine-wide Schmitt trigger buffer/line driver; inverting	●	●
9015	nine-wide Schmitt trigger buffer/line driver	●	●
9114	nine-wide Schmitt trigger buffer; open drain output; inverting	●	●
9115	nine-wide Schmitt trigger buffer; open drain output	●	●
BUS ICs			
242	quad bus transceiver; 3-state; inverting	●	●
243	quad bus transceiver; 3-state	●	●
245	octal bus transceiver; 3-state	●	●
640	octal bus transceiver; 3-state; inverting	●	●
643	octal bus transceiver; 3-state; true/inverting	●	●
646	octal bus transceiver/register; 3-state	●	●
648	octal bus transceiver/register; 3-state; inverting	●	●
COMPARATORS			
85	4-bit magnitude comparator	●	●
688	8-bit magnitude comparator	●	●

PC74 FAMILY		HC	HCT
COUNTERS			
93	4–bit binary ripple counter	●	●
160	presettable synchronous BCD decade counter; asynchronous reset	●	●
161	presettable synchronous 4–bit binary counter; asynchronous reset	●	●
162	presettable synchronous BCD decade counter; synchronous reset	●	●
163	presettable synchronous 4–bit binary counter; synchronous reset	●	●
190	presettable synchronous BCD decade up/down counter	●	●
191	presettable synchronous 4–bit binary up/down counter	●	●
192	presettable synchronous BCD decade up/down counter	●	●
193	presettable synchronous 4–bit binary up/down counter	●	●
390	dual decade ripple counter	●	●
393	dual 4–bit binary ripple counter	●	●
4017	Johnson decade counter with 10 decoded outputs	●	●
4020	14–stage binary ripple counter	●	●
4024	7–stage binary ripple counter	●	●
4040	12–stage binary ripple counter	●	●
4059	programmable divide–by–n counter	●	●
4060	14–stage binary ripple counter with oscillator	●	●
4510	BCD up/down counter	●	●
4516	binary up/down counter	●	●
4518	dual synchronous BCD counter	●	●
4520	dual synchronous 4–bit binary counter	●	●
40102	8–bit synchronous BCD down counter	●	●
40103	8–bit synchronous binary down counter	●	●
DECODERS			
42	BCD to decimal decoder (1–of–10)	●	●
137	3–to–8 line decoder/demultiplexer with address latches	●	●
138	3–to–8 line decoder/demultiplexer; inverting	●	●
139	dual 2–to–4 line decoder/demultiplexer	●	●
154	4–to–16 line decoder/demultiplexer	●	●
237	3–to–8 line decoder/demultiplexer with address latches	●	●
238	3–to–8 line decoder/demultiplexer	●	●
4511	BCD to 7–segment latch/decoder/driver	●	●
4514	4–to–16 line decoder/demultiplexer with input latches	●	●
4515	4–to–16 line decoder/demultiplexer with input latches	●	●
4543	BCD–to–7 segment latch/decoder/driver for LCDs	●	●
DEMULTIPLEXERS			
4051	8–channel analog multiplexer/demultiplexer	●	●
4052	dual 4–channel analog multiplexer/demultiplexer	●	●
4053	triple 2–channel analog multiplexer/demultiplexer	●	●
4067	16–channel analog multiplexer/demultiplexer	●	●

PC74 FAMILY		HC	HCT
DEMULTIPLEXERS (cont.)			
4351	8–channel analog multiplexer/demultiplexer with latch	●	●
4352	dual 4–channel analog multiplexer/demultiplexer with latch	●	●
4353	triple 2–channel analog multiplexer/demultiplexer with latch	●	●
4514	4–to–16 line decoder/demultiplexer with input latches	●	●
4515	4–to–16 line decoder/demultiplexer with input latches	●	●
DRIVERS			
4511	BCD to 7–segment latch/decoder/driver	●	●
4543	BCD–to–7 segment latch/decoder/driver for LCDs	●	●
ENCODERS			
147	10–to–4 line priority encoder	●	●
FLIP–FLOPS			
D–type			
74	dual D–type flip–flop with set and reset; positive edge–trigger	●	●
173	quad D–type flip–flop; positive–edge trigger; 3–state	●	●
174	hex D–type flip–flop with reset; positive–edge trigger	●	●
175	quad D–type flip–flop with reset; positive edge–trigger	●	●
273	octal D–type flip–flop with reset; positive edge–trigger	●	●
373	octal D–type transparent latch; 3–state	●	●
374	octal D–type flip–flop; positive–edge trigger; 3–state	●	●
377	octal D–type flip–flop with data enable; positive–edge trigger	●	●
533	octal D–type transparent latch; 3–state; inverting	●	●
534	octal D–type flip–flop; positive–edge trigger; 3–state; inverting	●	●
563	octal D–type transparent latch; 3–state; inverting; bus–oriented pin–out	●	●
564	octal D–type flip–flop; positive–edge trigger; 3–state; inverting; bus–oriented pin–out	●	●
573	octal D–type transparent latch; 3–state; bus–oriented pin–out	●	●
574	octal D–type flip–flop; positive–edge trigger; 3–state; bus–oriented pin–out	●	●

PC74 FAMILY		HC	HCT
FLIP–FLOPS (cont.)			
JK			
73	dual JK flip–flop with reset; negative–edge trigger; supply on centre pins	●	●
107	dual JK flip–flop with reset; negative–edge trigger	●	●
109	dual JK flip–flop with set and reset; positive edge–trigger	●	●
112	dual JK flip–flop with set and reset; negative edge–trigger	●	●
GATES			
AND			
08	quad 2–input AND gate	●	●
11	triple 3–input AND gate	●	●
21	dual 4–input AND gate	●	●
58	dual AND–OR gate	●	
EXCLUSIVE–OR			
86	quad 2–input EXCLUSIVE–OR gate	●	●
EXCLUSIVE–NOR			
7266	quad 2–input EXCLUSIVE–NOR gate	●	
NAND			
00	quad 2–input NAND gate	●	●
03	quad 2–input NAND gate; open drain	●	●
10	triple 3–input NAND gate	●	●
20	dual 4–input NAND gate	●	●
30	8–input NAND gate	●	●
NOR			
02	quad 2–input NOR gate	●	●
27	triple 3–input NOR gate	●	●
4002	dual 4–input NOR gate	●	●
OR			
32	quad 2–input OR gate	●	●
58	dual AND–OR gate	●	
4075	triple 3–input OR gate	●	●
INVERTERS			
04	hex inverter	●	●
U04	hex inverter (unbuffered)	●	

PC74 FAMILY		HC	HCT
LATCHES			
75	quad bistable transparent latch	●	●
259	8-bit addressable latch	●	●
354	8-input multiplexer/register with transparent latches; 3-state	●	●
LEVEL SHIFTERS			
4049	hex inverting HIGH-to-LOW level shifter	●	
4050	hex HIGH-to-LOW level shifter	●	
MULTIPLEXERS			
151	8-input multiplexer	●	●
153	dual 4-input multiplexer	●	●
157	quad 2-input multiplexer	●	●
158	quad 2-input multiplexer; inverting	●	●
251	8-input multiplexer; 3-state	●	●
253	dual 4-input multiplexer; 3-state	●	●
257	quad 2-input multiplexer; 3-state	●	●
258	quad 2-input multiplexer; 3-state; inverting	●	●
354	8-input multiplexer/register with transparent latches; 3-state	●	●
356	8-input multiplexer/register; 3-state	●	●
4051	8-channel analog multiplexer/demultiplexer	●	●
4052	dual 4-channel analog multiplexer/demultiplexer	●	●
4053	triple 2-channel analog multiplexer/demultiplexer	●	●
4067	16-channel analog multiplexer/demultiplexer	●	●
4351	8-channel analog multiplexer/demultiplexer with latch	●	●
4352	dual 4-channel analog multiplexer/demultiplexer with latch	●	●
4353	triple 2-channel analog multiplexer/demultiplexer with latch	●	●
MULTIVIBRATORS			
5555	programmable delay timer with oscillator	●	●
One-shot			
123	dual retriggerable monostable multivibrator with reset	●	●
221	dual non-retriggerable monostable multivibrator with reset	●	●
423	dual retriggerable monostable multivibrator with reset	●	●
4538	dual retriggerable precision monostable multivibrator	●	●
5555	programmable delay timer with oscillator	●	●
REGISTERS			
164	8-bit serial-in/parallel-out shift register	●	●
165	8-bit parallel-in/serial-out shift register	●	●
166	8-bit parallel-in/serial-out shift register; with reset	●	●

PC74 FAMILY		HC	HCT
REGISTERS (cont.)			
194	4–bit bidirectional universal shift register	●	●
195	4–bit parallel access shift register	●	●
299	8–bit universal shift register; 3–state	●	●
354	8–input multiplexer/register with transparent latches; 3–state	●	●
356	8–input multiplexer/register; 3–state	●	●
597	8–bit shift register with input latches	●	●
670	4 x 4 register file; 3–state	●	●
4015	dual 4–bit serial–in/parallel–out shift register	●	●
4094	8–stage shift–and–store bus register	●	●
7030	9–bit x 64 word FIFO register; 3–state	●	●
7597	8–bit shift register with input latches	●	●
40104	4–bit bidirectional universal shift register; 3–state	●	●
40105	4–bit x 16 word FIFO register	●	●
SCHMITT TRIGGERS			
14	hex inverting Schmitt trigger	●	●
132	quad 2–input NAND Schmitt trigger	●	●
7540	octal Schmitt trigger buffer/line driver; 3–state; inverting	●	●
7541	octal Schmitt trigger buffer/line driver; 3–state	●	●
9014	nine–wide Schmitt trigger buffer/line driver; inverting	●	●
9015	nine–wide Schmitt trigger buffer/line driver	●	●
9114	nine–wide Schmitt trigger buffer; open drain output; inverting	●	●
9115	nine–wide Schmitt trigger buffer; open drain output	●	●
SPECIAL FUNCTIONS			
297	digital phase–locked–loop filter	●	●
4046A	phase–locked loop with VCO	●	●
7046A	PLL with lock detector	●	●
SWITCHES			
4016	quad bilateral switches (uncompensated switches)	●	●
4066	quad bilateral switches	●	●
4316	quad bilateral switches; separate analog ground	●	●
TRANCEIVERS			
242	quad bus transceiver; 3–state; inverting	●	●
243	quad bus transceiver; 3–state	●	●
245	octal bus transceiver; 3–state	●	●
640	octal bus transceiver; 3–state; inverting	●	●
643	octal bus transceiver; 3–state; true/inverting	●	●
646	octal bus transceiver/register; 3–state	●	●
648	octal bus transceiver/register; 3–state; inverting	●	●

ACL 74 FAMILY SPECIFICATIONS

General

These family specifications cover the common electrical ratings and characteristics of the entire ACL 74 family, unless otherwise specified in the individual device data sheet.

Introduction

The 74AC/ACT11XXX 1 µm CMOS logic family combines the low power advantages of CMOS family with the high speed and drive capability of FAST TTL.
The basic family of devices, designated as 74AC11XXX, will operate at CMOS input logic levels for high noise immunity, negligible quiescent supply and input current. It operates from a power supply of 3 to 5.5 V.
A subset of the family, designated as 74ACT11XXX, with the same features and functions as the "AC–types", will operate at standard TTL power supply voltage (5 V ± 10%) and logic input levels (0,8 to 2,0 V).

Handling MOS devices

Inputs and outputs are protected against electrostatic effects in a wide variety of device–handling situations. However, to be totally safe, it is desirable to take handling precautions into account.

Features

- Comprehensive type range from simple gates to shift registers and counters
- All types available in 74AC versions (CMOS input levels) and ACT versions (TTL input levels)
- All types available in small outline (SO) and plastic dual in–line (PLDIL) packages
- Completely latch–up free
- Highly immune to electrostatic discharge
- Low power dissipation
- 24 mA sink/source current
- Input current only 1 µA in the HIGH or LOW state. The fan–out to other CMOS ICs) is therefore limited only by load capacitance and not by DC load considerations
- More than three times the noise immunity of TTL
- Input switching threshold level varies by only ± 60 mV over the entire temperature range (± 300 mV is specified for advanced TTL families)
- Wide supply voltage range:
  3 to 5.5 V for 74AC devices (internal logic states are maintained down to 2 V)
  5 V ± 10% for 74ACT devices
- On–chip propagation delay for a single gate is 0.5 ns; with a 5 V supply and 50 pF load, average propagation delay for a device is 5 ns (HIGH–to–LOW or LOW–to–HIGH)
- Outputs have edge–control circuits that reduce switching noise
- Output buffers are standardized to allow symmetrical output current sourcing and sinking for equal output rise and fall times
- Centre supply pins and flow–through architecture minimize ground and supply rail glitches during simultaneous switching of outputs, and simplify board layout
- All inputs that control more than one output have a new (patented) dynamic hysteresis that reduces susceptibility to slow input edges
- Wide operating temperature range: − 40 to + 85 °C
- Alternate source is TI

Type number designation

Basic family:

74*** ***** *	complete type number; standard commercial temperature range

74*** ***** *

	package code:
N	= plastic DIL;
D	= plastic mini–pack (SO)
	device number (3 digits, functionally compatible to LSTTL code; 000 = 00, 074 = 74)
AC	= CMOS input switching levels; supply voltage range 3 to 5.5 V
ACT	= TTL input switching levels; supply voltage range 5 V ± 10%;

Family ratings

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Voltages are referenced to GND (ground = 0 V)

parameter	conditions	symbol	min.	max.	unit
DC supply voltage		V_{CC}	-0.5	$+7$	V
DC input diode current	$V_I < 0$ or $V_I > V_{CC}$	$\pm I_{IK}$	–	20	mA
DC input voltage		V_I	-0.5	V_{CC} $+0.5$	V
DC output diode current	$V_O < 0$ or $V_O > V_{CC}$	$\pm I_{OK}$	–	50	mA
DC output voltage		V_O	-0.5	V_{CC} $+0.5$	V
DC output source or sink current	$-0.5\ V < V_O < V_{CC} + 0.5\ V$	$\pm I_O$	–	50	mA
Storage temperature range		T_{stg}	-65	$+150$	°C
Power dissipation per package					
plastic DIL	above +70 °C derate linearly by 8 mW/K	P_{tot}	–	500	mW
plastic mini–pack (SO)	above +70 °C derate linearly by 6 mW/K	P_{tot}	–	400	mW

Recommended operating conditions

Voltages are referenced to GND (ground = 0 V)

parameter	symbol	min.	typ.	max.	unit	conditions
DC supply voltage range						
74AC	V_{CC}	3.0	5.0	5.5	V	
74ACT	V_{CC}	4.5	5.0	5.5	V	
HIGH level input voltage						
74AC	V_{IH}	2.1	–	–	V	V_{CC} = 3 V
		3.15	–	–	V	V_{CC} = 4.5 V
		3.85	–	–	V	V_{CC} = 5.5 V
74ACT	V_{IH}	2.0	–	–	V	V_{CC} = 4.5 V
		2.0	–	–	V	V_{CC} = 5.5 V
LOW level input voltage						
74AC	V_{IL}	–	–	0.9	V	V_{CC} = 3.0 V
		–	–	1.35	V	V_{CC} = 4.5 V
		–	–	1.65	V	V_{CC} = 5.5 V
74ACT	V_{IL}	–	–	0.8	V	V_{CC} = 4.5 V
		–	–	0.8	V	V_{CC} = 5.5 V
DC input voltage range	V_I	0	–	V_{CC}	V	
DC output voltage range	V_O	0	–	V_{CC}	V	
Operating ambient temperature range	T_{amb}	−40	–	+85	°C	standard

DC family characteristics, 74AC

Voltages are referenced to GND (ground = 0 V)

			T_{amb} (°C)							
	V_{CC}		+25			−40 to +85			conditions	
parameter	V	symbol	min.	typ.	max.	min.	max.	unit	V_I	other
HIGH level output voltage	3.0	V_{OH}	2.9	–	–	2.9	–	V	V_{IH}	$-I_O = 50\ \mu A$
	4.5		4.4	–	–	4.4	–	V	or	$-I_O = 50\ \mu A$
	5.5		5.4	–	–	5.4	–	V	V_{IL}	$-I_O = 50\ \mu A$
	3.0	V_{OH}	2.58	–	–	2.48	–	V	V_{IH}	$-I_O = 4$ mA
	4.5		3.94	–	–	3.80	–	V	or	$-I_O = 24$ mA
	5.5		4.94	–	–	4.80	–	V	V_{IL}	$-I_O = 24$ mA
HIGH level output drive	5.5	V_{OH}	–	–	–	3.85	–	V		$-I_O = 75$ mA see note
LOW level output voltage	3.0	V_{OL}	–	–	0.1	–	0.1	V	V_{IH}	$I_O = 50\ \mu A$
	4.5		–	–	0.1	–	0.1	V	or	$I_O = 50\ \mu A$
	5.5		–	–	0.1	–	0.1	V	V_{IL}	$I_O = 50\ \mu A$
	3.0	V_{OL}	–	–	0.36	–	0.44	V	V_{IH}	$I_O = 12$ mA
	4.5		–	–	0.36	–	0.44	V	or	$I_O = 24$ mA
	5.5		–	–	0.36	–	0.44	V	V_{IL}	$I_O = 24$ mA
LOW level output drive	5.5	V_{OH}	–	–	–	–	1.65	V		$I_O = 75$ mA see note
Input leakage current	5.5	$\pm I_I$	–	–	0.1	–	1.0	µA	V_{CC} or GND	
3–state OFF–state current	5.5	$\pm I_{OZ}$	–	–	0.5	–	5.0	µA	V_{IH} or V_{IL}	$V_O = V_{CC}$ or GND
Quiescent supply current										
SSI	5.5	I_{CC}	–	–	4.0	–	40	µA	V_{CC} or	$I_O = 0$
MSI	5.5	I_{CC}	–	–	8.0	–	80	µA	GND	$I_O = 0$

Note: Not more than one output should be tested at a time and the duration of the test should not exceed 10 ms. This parameter has been introduced the meet the requirements of incident wave switching of 50 Ω loads.

DC family characteristics, 74ACT

Voltages are referenced to GND (ground = 0 V)

parameter	V_{CC} V	sym- bol	T_{amb} (°C) +25 min.	+25 typ.	+25 max.	−40 to +85 min.	−40 to +85 max.	unit	conditions V_I	conditions other
HIGH level output voltage	4.5	V_{OH}	4.4 3.94	– –	– –	4.4 3.8	– –	V V	V_{IH} or V_{IL}	$-I_O$ = 50 µA $-I_O$ = 24 mA
HIGH level output drive	5.5	V_{OH}	–	–	–	3.85	–	V	V_{IH} or V_{IL}	$-I_O$ = 75 mA see note 1
LOW level output voltage	4.5	V_{OL}	– –	– –	0.1 0.36	–	0.1 0.44	V V	V_{IH} or V_{IL}	I_O = 50 µA I_O = 24 mA
LOW level output drive	5.5	V_{OL}	–	–	–	–	1.65	V	V_{IH} or V_{IL}	I_O = 75 mA see note 1
3–state OFF–state current	5.5	$\pm I_{OZ}$	–	–	0.5	–	5.0	µA	V_{IH} or V_{IL}	$V_O = V_{CC}$ or GND
Quiescent supply current										
SSI	5.5	I_{CC}	–	–	4.0	–	40	µA	V_{CC} or GND	I_O = 0
MSI	5.5	I_{CC}	–	–	8.0	–	80	µA		I_O = 0
A.Q.S.C. (see note 2)	5.5	ΔI_{CC}	–	0.9	1.0	–	1.0	µA	V_{CC} or GND	I_O = 0 one input at 3.4 V

Note 1: Not more than one output should be tested at a time and the duration of the test should not exceed 10 ms. This parameter has been introduced the meet the requirements of incident wave switching of 50 Ω loads.

Note 2: Additional quiescent supply current (A.Q.S.C.) per input pin for unit load coefficient is 1.

ACL 74 FAMILY SURVEY

74AC/ACT FAMILY		AC	ACT
ARITHMETIC ICs			
11181	4–bit arithmetic unit	●	●
11280	9–bit odd/even parity generator/checker	●	●
11286	9–bit odd/even parity generator/checker with bus driver I/O port	●	●
11520	8–bit identity comparator with input pull–up	●	●
11521	8–bit identity comparator	●	●
11881	4–bit arithmetic logic unit with status check register	●	●
11882	32–bit look–ahead carry generator	●	●
BUFFERS/LINE DRIVERS			
11240	octal buffer/line driver; 3–state; inverting	●	●
11241	octal buffer/line driver; 3–state	●	●
11244	octal buffer/line driver; 3–state	●	●
11655	octal buffer/line driver with 9–bit parity generator/checker; 3–state; inverting	●	●
11656	octal buffer/line driver with 9–bit parity generator/checker; 3–state	●	●
11827	10–wide buffer/line driver; 3–state	●	●
11828	10–wide buffer/line driver; 3–state; inverting	●	●
COMPARATORS			
11677	16–bit address comparator with enable	●	●
11678	16–bit address comparator with output latch	●	●
11860	8–bit address comparator	●	●
11865	8–bit address comparator	●	●
11885	8–bit address comparator	●	●
COUNTERS			
11160	synchronous presettable, synchronous BCD decade counter; asynchronous reset	●	●
11161	synchronous presettable, synchronous 4–bit binary counter; asynchronous reset	●	●
11162	synchronous presettable, synchronous BCD decade counter; synchronous reset	●	●
11163	synchronous presettable, synchronous 4–bit binary counter; synchronous reset	●	●
11168	synchronous BCD decade up/down counter	●	●
11169	synchronous presettable, synchronous 4–bit binary decade up/down counter	●	●
11190	asynchronous presettable, synchronous BCD decade up/down counter with single clock	●	●
11191	asynchronous presettable, synchronous 4–bit binary up/down counter with single clock	●	●
11192	asynchronous presettable, synchronous BCD decade up/down counter with dual clock	●	●
11193	asynchronous presettable, synchronous 4–bit binary up/down counter with dual clock	●	●

74AC/ACT FAMILY		AC	ACT
COUNTERS (cont.)			
11269	synchronous presettable, 4–bit binary up/down counter	●	●
11461	synchronous presettable, synchronous 8–bit binary counter; asynchronous reset	●	●
11463	synchronous presettable, synchronous 8–bit binary counter; synchronous reset	●	●
11469	synchronous presettable, synchronous 8–bit binary up/down counter	●	●
11568	synchronous presettable, BCD decade up/down counter with synchronous and asynchronous reset	●	●
11569	synchronous presettable, 4–bit binary up/down counter with synchronous and asynchronous reset	●	●
11579	8–bit binary up/down counter with common I/O pins; synchronous and asynchronous reset; 3–state	●	●
11590	synchronous 8–bit binary counter with output registers; asynchronous reset	●	●
11592	synchronous 8–bit binary counter with input registers; asynchronous reset	●	●
11593	synchronous 8–bit binary counter with input registers; asynchronous reset; 3–state	●	●
11867	synchronous presettable, synchronous 8–bit binary up/down counter; asynchronous reset	●	●
11869	synchronous presettable, synchronous 8–bit binary up/down counter; synchronous reset	●	●
DECODERS			
11138	3–to–8 line decoder/demultiplexer; active–LOW	●	●
11139	dual 2–to–4 line decoder/demultiplexer; active–LOW	●	●
11154	4–to–16 line decoder/demultiplexer	●	●
11238	3–to–8 line decoder/demultiplexer; active–HIGH	●	●
11239	dual 2–to–4 line decoder/demultiplexer; active–HIGH	●	●
DEMULTIPLEXERS			
11138	3–to–8 line decoder/demultiplexer; active–LOW	●	●
11139	dual 2–to–4 line decoder/demultiplexer; active–LOW	●	●
11154	4–to–16 line decoder/demultiplexer	●	●
11238	3–to–8 line decoder/demultiplexer; active–HIGH	●	●
11239	dual 2–to–4 line decoder/demultiplexer; active–HIGH	●	●
DRIVERS			
11208	dual 1–to–4 line driver; 3–state	●	●
11240	octal buffer/line driver; 3–state; inverting	●	●
11241	octal buffer/line driver; 3–state	●	●
11244	octal buffer/line driver; 3–state	●	●
11655	octal buffer/line driver with 9–bit parity generator/checker; 3–state; inverting	●	●
11656	octal buffer/line driver with 9–bit parity generator/checker; 3–state	●	●
11827	10–wide buffer/line driver; 3–state	●	●
11828	10–wide buffer/line driver; 3–state; inverting	●	●

74AC/ACT FAMILY		AC	ACT
FLIP-FLOPS			
D-type			
11074	dual D-type flip-flop with set and reset; positive-edge trigger	●	●
11174	hex D-type flip-flop with reset; positive-edge trigger	●	●
11175	quad D-type flip-flop with reset; positive-edge trigger	●	●
11273	octal D-type flip-flop with reset; positive-edge trigger	●	●
11373	octal D-type transparent latch; 3-state	●	●
11374	octal D-type flip-flop; positive-edge trigger; 3-state	●	●
11377	octal D-type flip-flop with enable; positive-edge trigger	●	●
11378	hex D-type flip-flop with enable; positive-edge trigger	●	●
11379	quad D-type flip-flop with data enable	●	●
11533	octal D-type transparent latch; 3-state; inverting	●	●
11534	octal D-type flip-flop; positive-edge trigger; 3-state; inverting	●	●
11821	10-wide D-type flip-flop; positive-edge trigger; 3-state	●	●
11822	10-wide D-type flip-flop; positive-edge trigger; 3-state; inverting	●	●
11823	9-wide D-type flip-flop with reset and enable; positive-edge trigger; 3-state	●	●
11824	9-wide D-type flip-flop with reset and enable; positive-edge trigger; 3-state; inverting	●	●
11825	octal D-type flip-flop with reset and enable; positive-edge trigger; 3-state	●	●
11826	octal D-type flip-flop with reset and enable; positive-edge trigger; 3-state; inverting	●	●
11841	10-wide D-type transparent latch; 3-state	●	●
11842	10-wide D-type transparent latch; 3-state; inverting	●	●
11843	9-wide D-type transparent latch with set and reset; 3-state	●	●
11844	9-wide D-type transparent latch with set and reset; 3-state; inverting	●	●
11845	octal D-type transparent latch with set and reset; 3-state	●	●
11846	octal D-type transparent latch with set and reset; 3-state; inverting	●	●
11873	dual D-type transparent latch with reset; 3-state	●	●
11874	dual D-type 4-bit flip-flop latch with reset; 3-state	●	●
JK			
11109	dual JK with set and reset; positive-edge trigger	●	●
11112	dual JK with set and reset; negative-edge trigger	●	●

74AC/ACT FAMILY		AC	ACT
GATES			
AND			
11008	quad 2–input AND gate	●	●
11011	triple 3–input AND gate	●	●
11021	dual 4–input AND gate	●	●
11051	dual 2–wide 2–input, 2–wide 3–input AND–OR–invert gate	●	●
11064	4–2–3–2–input AND–OR–invert gate	●	●
11800	triple 4–input AND/NAND gate	●	●
Complex			
11051	dual 2–wide 2–input, 2–wide 3–input AND–OR–invert gate	●	●
11064	4–2–3–2–input AND–OR–invert gate	●	●
EXCLUSIVE–OR			
11086	quad 2–input EXCLUSIVE–OR gate	●	●
EXCLUSIVE–NOR			
11810	quad 2–input EXCLUSIVE–NOR gate	●	●
Inverter			
11051	dual 2–wide 2–input, 2–wide 3–input AND–OR–invert gate	●	●
11064	4–2–3–2–input AND–OR–invert gate	●	●
NAND			
11000	quad 2–input NAND gate	●	●
11010	triple 3–input NAND gate	●	●
11013	dual 4–input NAND Schmitt trigger	●	●
11020	dual 4–input NAND gate	●	●
11030	8–input NAND gate	●	●
11132	quad 2–input NAND Schmitt trigger	●	●
NOR			
11002	quad 2–input NOR gate	●	●
11027	triple 3–input NOR gate	●	●
11802	triple 4–input OR/NOR gate	●	●
OR			
11032	quad 2–input OR gate	●	●
11064	4–2–3–2–input AND–OR–invert gate	●	●
11802	triple 4–input OR/NOR gate	●	●

74AC/ACT FAMILY SERIES		AC	ACT
INVERTERS			
11004	hex inverter	●	●
11014	hex inverter Schmitt trigger	●	●
11034	hex non–inverter	●	●
LATCHES			
11373	octal D–type transparent latch; 3–state	●	●
11533	octal D–type transparent latch; 3–state; inverting	●	●
11841	10–wide D–type transparent latch; 3–state	●	●
11842	10–wide D–type transparent latch; 3–state; inverting	●	●
11843	9–wide D–type transparent latch with set and reset; 3–state	●	●
11844	9–wide D–type transparent latch with set and reset; 3–state; inverting	●	●
11845	octal D–type transparent latch with set and reset; 3–state	●	●
11846	octal D–type transparent latch with set and reset; 3–state; inverting	●	●
11873	dual D–type transparent latch with reset; 3–state	●	●
MULTIPLEXERS			
11150	16–input multiplexer; 3–state; inverting	●	●
11151	8–input multiplexer	●	●
11153	dual 4–input multiplexer	●	●
11157	quad 2–input multiplexer	●	●
11158	quad 2–input multiplexer; inverting	●	●
11250	16–input multiplexer; 3–state	●	●
11251	8–input multiplexer; 3–state	●	●
11253	dual 4–input multiplexer; 3–state	●	●
11257	quad 2–input multiplexer; 3–state	●	●
11258	quad 2–input multiplexer; 3–state; inverting	●	●
11352	dual 4–input multiplexer; inverting	●	●
11353	dual 4–input multiplexer; 3–state; inverting	●	●
REGISTERS			
11194	4–bit bidirectional universal shift register	●	●
11299	8–bit universal shift/storage register with asynchronous reset and common I/O pins	●	●
11323	8–bit universal shift/storage register with synchronous reset and common I/O pins	●	●
11818	8–bit diagnostic/pipe–line register	●	●
11819	8–bit diagnostic/pipe–line register with parity output	●	●
11858	16–word by 5–bit dual port register	●	●
11859	32–word by 4–bit dual port register	●	●
11870	14–word by 4–bit register	●	●
11898	10–bit serial–in parallel–out shift register	●	●
11979	8–bit multiplexed I/O read–back register	●	●
11980	16–word by 8–bit multiplexed I/O read–back register	●	●
11981	16–word by 8–bit multiplexed I/O read–back register with address latch	●	●

74AC/ACT FAMILY		AC	ACT
REGISTERS (cont.)			
11987	8–word by 9–bit multiplexed I/O read–back register	●	●
11988	8–word by 9–bit multiplexed I/O read–back register with address latch	●	●
SCHMITT TRIGGERS			
11013	dual 4–input NAND Schmitt trigger	●	●
11014	hex inverter Schmitt trigger	●	●
11132	quad 2–input NAND Schmitt trigger	●	●
TRANCEIVERS			
11245	octal transceiver with direction pin; 3–state	●	●
11470	octal transceiver/register with dual enable; 3–state	●	●
11471	octal transceiver/register with dual enable; 3–state; inverting	●	●
11472	9–wide latched transceiver with dual enable; 3–state	●	●
11473	9–wide latched transceiver with dual enable; 3–state; inverting	●	●
11474	9–wide latched transceiver/register with dual enable; 3–state	●	●
11475	9–wide latched transceiver/register with dual enable; 3–state; inverting	●	●
11543	octal latched transceiver with dual enable; 3–state	●	●
11544	octal latched transceiver with dual enable; 3–state; inverting	●	●
11620	octal transceiver with dual enable; 3–state; inverting	●	●
11623	octal transceiver with dual enable; 3–state	●	●
11640	octal transceiver with direction pin; 3–state; inverting	●	●
11643	octal transceiver; 3–state; true/inverting	●	●
11646	octal transceiver/register with direction pin; 3–state	●	●
11648	octal transceiver/register with direction pin; 3–state; inverting	●	●
11651	octal transceiver/register with dual enable; 3–state; inverting	●	●
11652	octal transceiver/register with dual enable; 3–state	●	●
11657	octal transceiver with 8–bit parity checker/ generator	●	●
11833	8–bit transceiver with 9–bit parity checker/ generator and error flip–flop	●	●
11834	8–bit inverting transceiver with 9–bit parity checker/generator and error flip–flop	●	●
11852	8–bit universal transceiver port controller	●	●
11853	8–bit transceiver with 9–bit parity checker/ generator and error flag latch	●	●
11854	8–bit inverting transceiver with 9–bit parity checker/generator and error flag latch	●	●
11856	8–bit universal transceiver port controller	●	●
11861	10–wide transceiver; 3–state	●	●

74AC/ACT FAMILY		AC	ACT
TRANCEIVERS (cont.)			
11862	10–wide transceiver; 3–state; inverting	●	●
11863	9–wide transceiver; 3–state	●	●
11864	9–wide transceiver; 3–state; inverting	●	●
11877	8–bit universal transceiver port controller	●	●

TTL FAMILY CHARACTERISTICS COMPARISON

	SSI gates propagation delay	flip–flops toggle rate	MSI ALU 4–bit add time
STANDARD TTL (STD: basic type number 74XX) 7400 Series SSI and MSI 8200 Series MSI 9300 and 9600 Series MSI Standard "gold doped" TTL is the industry's longest selling digital logic family still in high volume production. New system designs generally favor the Low Power Schottky TTL equivalent functions.	10 ns at 10 mW	25 MHz	27 ns
LOW POWER SCHOTTKY TTL (LS) 74LS00 Series SSI and MSI Low power Schottky provides the same speed as standard TTL at 1/5 the power. The power savings and LSI potential are encouraging the use of 74LS in most new system designs.	10 ns at 2 mW	30 MHz	21 ns
SCHOTTKY TTL (S) 74S00 Series SSI, MSI and 82S00 Series MSI Schottky TTL uses a diode clamp design to ensure the highest speed possible at TTL logic levels.	3 ns at 30 mW	90 MHz	11 ns
FAST TTL (F) 74F00 Series SSI and MSI New FAST Series offers higher speeds than Schottky TTL.	3 ns at 4 mW	–	–
HC/HCT CMOS For information see previous chapter HCMOS PC74.			
AC/ACT CMOS For information see previous chapter ACL 74 FAMILY.			

TTL 74 SERIES SURVEY

N74 SERIES		STD	LS	S	F	ALS
ARITHMETIC ICs						
83	4–bit BCD adder	●			●	
83A	4–bit binary full adder (fast carry)		●			
180	8–bit odd/even parity generator/checker	●				
181	4–bit arithmetic logic unit	●	●	●	●	
182	look–ahead carry generator			●	●	
280	9–bit odd/even parity generator/checker			●		
280A	9–bit odd/even parity generator/checker				●	
280B	9–bit odd/even parity generator/checker				●	
283	4–bit full adder with fast carry		●		●	
381	4–bit arithmetic logic unit				●	
382	4–bit arithmetic logic unit				●	
385	quad serial adder/substractor				●	
582	4–bit BCD arithmetic logic unit				●	
583	4–bit BCD adder				●	
881	arithmetic logic unit/function generator				●	
882	32–bit look–ahead carry generator				●	
BUFFERS						
06	hex inverter buffer/driver (open collector)	●				
07	hex buffer/driver (open collector)	●				
16	hex inverter buffer/driver (open collector)	●				
17	hex buffer/driver (open collector)	●				
125	quad buffer (3–state)	●			●	
125A	quad buffer (3–state)		●			
126	quad buffer (3–state)	●			●	
126A	quad buffer (3–state)		●			
240	octal inverter buffer (3–state)		●	●	●	
240A	octal inverter buffer (3–state)					●
240A–1	octal inverter buffer (3–state)					●
241	octal buffer (3–state)		●	●	●	
241A	octal buffer (3–state)					●
241A–1	octal buffer (3–state)					●
244	octal buffer (3–state)		●	●	●	
244A	octal buffer (3–state)					●
244A–1	octal buffer (3–state)					●
365	hex buffer/driver (3–state)				●	
365A	hex buffer/driver (3–state)	●	●			
366	hex inverter buffer (3–state)				●	
366A	hex inverter buffer (3–state)	●	●			
367	hex buffer/driver (3–state)				●	
367A	hex buffer/driver (3–state)	●	●			
368	hex inverter buffer (3–state)				●	
368A	hex inverter buffer (3–state)	●	●			
455	octal buffer with parity generator checker				●	
456	octal buffer with parity generator checker				●	
540	octal buffer/line driver (3–state)		●		●	
541	octal non–inverting buffer/line driver (3–state)		●		●	
655	octal inverting buffer with parity generator checker				●	
655A	octal inverting buffer with parity generator checker				●	
656	octal buffer with parity generator checker				●	

N74 SERIES		STD	LS	S	F	ALS
BUFFERS (cont.)						
656A	octal buffer with parity generator checker				●	
827	10–bit buffer, non–inverting (3–state)				●	
828	10–bit buffer, inverting (3–state)				●	
1240	octal buffer (3–state); light load				●	
1241	octal buffer (3–state); light load				●	
1244	octal buffer (3–state)				●	
BUS ICs						
242	quad bus inverting transceiver (3–state)		●	●	●	
243	quad transceiver (3–state)		●	●	●	
245	octal bus transceiver (3–state)		●		●	
245A	octal bus transceiver (3–state)					●
245A–1	octal bus transceiver (3–state)					●
545	octal bus transceiver (3–state)				●	
620	octal bus transceiver (3–state)		●		●	
620A	octal bus transceiver (3–state)					●
620A–1	octal bus transceiver (3–state)					●
621	octal bus transceiver (open collector)		●		●	
622	octal bus transceiver (open collector)		●		●	
623	octal bus transceiver (3–state)		●		●	
623A	octal bus transceiver (3–state)					●
623A–1	octal bus transceiver (3–state)					●
640	octal bus transceiver, inverting (3–state)		●		●	
640–1	inverting octal bus transceiver (3–state)		●			
641	octal bus transceiver (open collector)		●		●	
641–1	octal bus transceiver (open collector)		●			
642	inverting octal bus transceiver (open collector)		●		●	
642–1	inverting octal bus transceiver (open collector)		●			
645	octal bus transceiver (3–state)		●			
645–1	octal bus transceiver (3–state)		●			
646	octal bus transceiver and register (3–state)				●	
647	octal bus transceiver and register (open collector)				●	
648	octal bus transceiver and register (3–state)				●	
649	octal bus transceiver and register (open collector)				●	
657	octal bus transceiver with parity generator checker				●	
1245	octal bus transceiver (3–state); light load				●	
COMPARATORS						
85	4–bit magnitude comparator	●	●	●	●	
521	8–bit identify comparator				●	
524	8–bit register comparator (open collector)				●	
COUNTERS						
90	4–bit decade ripple counter	●	●			
92	divide–by–twelve counter	●	●			
93	4–bit binary ripple counter	●	●			
160	synchronous BCD decade counter	●				
160A	synchronous BCD decade counter		●		●	

N74 SERIES		STD	LS	S	F	ALS
COUNTERS (cont.)						
161	synchronous 4–bit binary counter	●				
161A	synchronous 4–bit binary counter		●		●	
161B	synchronous 4–bit binary counter					●
162A	synchronous BCD decade counter		●		●	
163	synchronous 4–bit binary counter	●			●	
163A	synchronous 4–bit binary counter		●		●	
163B	synchronous 4–bit binary counter					●
168	synchronous BCD decade up/down counter			●	●	
168A	synchronous BCD decade up/down counter		●	●		
169	synchronous 4–bit binary up/down counter				●	
169A	synchronous 4–bit binary up/down counter		●	●		
190	presettable BCD/decade up/down counter	●			●	
191	presettable 4–bit binary up/down counter	●	●		●	●
192	presettable BCD/decade up/down counter	●	●		●	
193	presettable 4–bit binary up/down counter	●	●		●	●
197	presettable 4–bit binary ripple counter		●			
269	8–bit binary counter				●	
290	4–bit decade ripple counter		●			
293	4–bit binary ripple counter		●			
390	dual decade ripple counter		●			
393	dual 4–bit binary ripple counter		●		●	
490	dual BCD decade ripple counter		●			
568	BCD decade up/down synchronous counter (3–state)				●	
568A	BCD decade up/down synchronous counter (3–state)		●			
569	4–bit binary up/down synchronous counter (3–state)				●	
569A	4–bit binary up/down synchronous counter (3–state)		●			
579	8–bit up/down counter, common I/O (3–state)				●	
779	8–bit bidirectional binary counter (3–state)				●	
DECODERS						
42	BCD–to–decimal decoder (1–of–10)	●	●			
45	BCD–to–decimal decoder/driver (open collector)	●				
138	3–line to 8–line decoder/demultiplexer		●	●	●	●
139	dual 2–line to 4–line decoder/demultiplexer		●	●	●	●
145	BCD–to–decimal decoder/driver (open collector)	●				
154	4–line to 16–line decoder/demultiplexer	●	●		●	
155	dual 2–line to 4–line decoder/demultiplexer	●	●			
156	dual 2–line to 4–line decoder/demultiplexer (open collector)	●	●			
445	BCD–to–decimal decoder/driver (open collector)		●			
537	1–of–10 decoder (3–state)				●	
538	1–of–8 decoder (3–state)				●	
539	dual 1–of–4 decoder (3–state)				●	
547	octal decoder/multiplexer				●	
548	octal decoder/multiplexer				●	
DEMULTIPLEXERS						
138	3–line to 8–line decoder/demultiplexer					●
139	dual 2–line to 4–line decoder/demultiplexer					●

N74 SERIES		STD	LS	S	F	ALS
DRIVERS						
804	hex 2–input NAND driver				●	
805	hex 2–input NOR driver				●	
808	hex 2–input AND driver				●	
832	hex 2–input OR driver				●	
3037	quad 2–input NAND, 30 Ohm transmission line driver				●	
3038	quad 2–input NAND, 30 Ohm transmission line driver; open collector				●	
3040	dual 4–input NAND, 30 Ohm transmission line driver				●	
30240	octal inverting 30 Ohm transmission line driver; open collector				●	
30244	octal 30 Ohm transmission–line/backplane driver				●	
30245	octal transceiver/30 Ohm transmission line driver; open collector				●	
30640	octal transceiver, 30 Ohm transmission driver; inverting; open collector				●	
ENCODERS						
147	10–line to 4–line priority encoder	●				
148	8–line to 3–line priority encoder	●			●	
FLIP–FLOPS						
D–type						
74	dual D–type edge–triggered flip–flop	●		●	●	
74A	dual D–type edge–triggered flip–flop		●			●
173	quad D–type flip–flop (3–state)	●	●		●	
174	hex D–type flip–flop with reset	●	●	●	●	●
175	quad D–type edge–triggered flip–flop with reset	●	●	●	●	●
273	octal D–type flip–flop with reset		●	●	●	●
364	octal D–type flip–flop (3–state)		●			
373	octal transparent latch (3–state)		●	●	●	●
374	octal D–type flip–flop (3–state)		●	●	●	●
377	octal D–type flip–flop with clock enable		●		●	
378	hex D–type flip–flop with clock enable		●		●	
379	quad D flip–flop with enable				●	
534	octal D–type flip–flop (3–state)			●	●	
563	octal D latch (3–state) broadside pinout				●	●
564	octal D flip–flop (3–state) broadside pinout				●	●
573	octal D latch (3–state) broadside pinout				●	●
574	octal D flip–flop (3–state) broadside pinout				●	●
JK						
73	dual JK master–slave flip–flop	●	●			
76	dual JK master–slave flip–flop	●	●			
107	dual JK master–slave flip–flop	●	●			
109	dual JK positive–edge triggered flip–flop	●	●		●	
109A	dual JK positive–edge triggered flip–flop					●
112	dual JK negative–edge triggered flip–flop		●	●	●	
112A	dual JK negative–edge triggered flip–flop					●
113	dual JK positive–edge triggered flip–flop		●	●	●	
114	dual JK negative–edge triggered flip–flop				●	

N74 SERIES		STD	LS	S	F	ALS
GATES						
AND						
08	quad 2–input AND gate	●	●	●	●	●
09	quad 2–input AND gate (open collector)		●			
11	triple 3–input AND gate	●	●	●	●	
11A	triple 3–input AND gate					●
21	dual 4–input AND gate	●	●			
50	expandable dual 2–wide 2–input AND–OR–invert gate	●				
51	dual 2–wide 2–input AND–OR–invert gate	●	●	●	●	
54	4–wide 2 and 3–input AND–OR–invert gate		●			
64	4–2–3–2–input AND–OR–invert gate			●	●	
Complex						
50	expandable dual 2–wide 2–input AND–OR–invert gate	●				
51	dual 2–wide 2–input AND–OR–invert gate	●	●	●	●	
54	4–wide 2 and 3–input AND–OR–invert gate		●			
64	4–2–3–2–input AND–OR–invert gate			●	●	
EXCLUSIVE–OR						
86	quad 2–input EXCLUSIVE–OR gate	●	●	●	●	●
135	quad EXCLUSIVE–OR/NOR gate			●		
136	quad EXCLUSIVE–OR gate (open collector)		●			
EXCLUSIVE–NOR						
135	quad EXCLUSIVE–OR/NOR gate			●		
266	quad 2–input EXCLUSIVE–NOR gate (open collector)		●			
Inverter						
50	expandable dual 2–wide 2–input AND–OR–invert gate	●				
51	dual 2–wide 2–input AND–OR–invert gate	●	●	●	●	
54	4–wide 2 and 3–input AND–OR–invert gate		●			
64	4–2–3–2–input AND–OR–invert gate			●	●	
NAND						
00	quad 2–input NAND gate	●	●	●	●	
00A	quad 2–input NAND gate					●
01	quad 2–input NAND gate (open collector)		●			
03	quad 2–input NAND gate (open collector)	●		●		
10	triple 3–input NAND gate	●	●	●	●	
10A	triple 3–input NAND gate					●
20	dual 4–input NAND gate	●	●	●	●	
20A	dual 4–input NAND gate					●

N74 SERIES		STD	LS	S	F	ALS
GATES (cont.)						
NAND (cont.)						
26	quad 2–input NAND gate (open collector)	●	●			
30	8–input NAND gate	●	●		●	
30A	8–input NAND gate					●
37	quad 2–input NAND buffer	●	●	●	●	
38	quad 2–input NAND buffer (open collector)	●	●	●	●	
38A	quad 2–input NAND buffer (open collector)					●
39	quad 2–input NAND buffer (open collector)	●				
40	dual 4–input NAND buffer	●	●	●	●	
133	13–input NAND gate			●	●	
134	12–input NAND gate (3–state)			●		
140	dual 4–input NAND line driver (50 Ohm)			●		
NOR						
02	quad 2–input NOR gate	●	●	●	●	●
25	dual 4–input NOR gate with strobe	●				
27	triple 3–input NOR gate	●	●		●	●
28	quad 2–input NOR buffer	●				
33	quad 2–input NOR buffer (open collector)	●	●			
128	quad 2–input NOR buffer	●				
260	dual 5–input NOR gate		●	●	●	
OR						
32	quad 2–input OR gate	●	●	●	●	●
50	expandable dual 2–wide 2–input AND–OR–invert gate	●				
51	dual 2–wide 2–input AND–OR–invert gate	●	●	●	●	
54	4–wide 2 and 3–input AND–OR–invert gate		●			
64	4–2–3–2–input AND–OR–invert gate			●	●	
INVERTERS						
04	hex inverter	●	●	●	●	
04B	hex inverter					●
05	hex inverter (open collector)	●	●	●		
LATCHES						
75	quad bistable latch	●	●			
116	dual 4–bit transparent latch with reset	●				
256	dual 4–bit addressable latch		●		●	
259	8–bit addressable latch		●		●	
279	quadruple S–R latch	●				
363	octal transparent latch (3–state)		●			
375	quad transparent bistable latch		●			
412	multi–mode buffered latch; non–inverting **(3–state)**				●	
432	multi–mode buffered latch; inverting (3–state)				●	
533	inverting octal D–type latch (3–state)				●	
543	octal transparent bidirectional latch				●	
544	octal transparent bidirectional latch				●	
604	dual 8–bit latch (3–state)				●	
605	dual 8–bit latch (open collector)				●	

N74 SERIES

LATCHES (cont.)

N74 SERIES		STD	LS	S	F	ALS
841	10–bit latch, non–inverting (3–state)				●	
842	10–bit latch, inverting (3–state)				●	
843	9–bit latch, non–inverting (3–state)				●	
844	9–bit latch, inverting (3–state)				●	
845	8–bit latch, non–inverting (3–state)				●	
846	8–bit latch, inverting (3–state)				●	

MEMORIES

N74 SERIES		STD	LS	S	F	ALS
189	64–bit bipolar RAM (16x4)			●		
189A	64–bit bipolar RAM (16x4)				●	
301	256–bit bipolar RAM (256x1)		●	●		

MULTIPLEXERS

N74 SERIES		STD	LS	S	F	ALS
150	16–line to 1–line multiplexer	●				
151	8–line to 1–line multiplexer	●	●	●	●	●
151A	8–line to 1–line multiplexer				●	
153	dual 4–line to 1–line multiplexer	●	●	●	●	●
157	quad 2–input data selector/multiplexer; non–inverting	●	●	●	●	●
157A	quad 2–input data selector/multiplexer; non–inverting				●	
158	quad 2–input data selector/multiplexer; inverting	●	●	●	●	●
158A	quad 2–input data selector/multiplexer; inverting				●	
251	8–line to 1–line multiplexer (3–state)		●	●	●	●
251A	8–line to 1–line multiplexer (3–state)		●		●	
253	dual 4–line to 1–line multiplexer (3–state)		●	●	●	●
257	quad 2–line to 1–line data selector/multiplexer (3–state)			●	●	●
257A	quad 2–line to 1–line data selector/multiplexer (3–state)		●		●	
258	quad 2–line to 1–line data selector/multiplexer (3–state)			●	●	●
258A	quad 2–line to 1–line data selector/multiplexer (3–state)		●		●	
352	dual 4–input multiplexer		●		●	
353	dual 4–input multiplexer (3–state)		●		●	
711	quintuple 2–input multiplexer				●	
712	quintuple 3–input multiplexer				●	
723	quad 3–input multiplexer				●	
725	quad 3–input multiplexer				●	
732	quad data multiplexer				●	
733	quad data multiplexer				●	

MULTIVIBRATORS

Monostable

N74 SERIES		STD	LS	S	F	ALS
121	monostable multivibrator	●				
123	dual retriggerable monostable multivibrator	●				
221	dual monostable multivibrator	●				

N74 SERIES		STD	LS	S	F	ALS
REGISTERS						
91A	8–bit shift register	●				
94	4–bit shift register	●				
95	4–bit shift register	●				
95B	4–bit left–right shift register		●			
96	5–bit shift register	●	●			
164	8–bit serial–in/parallel–out shift register	●	●		●	●
165	8–bit parallel–in/serial–out shift register	●			●	
166	8–bit serial/parallel–in/serial–out shift register	●			●	
170	4x4 register file (open collector)	●	●			
172	16–bit multiple port register file (3–state)			●		
194	4–bit bidirectional universal shift register	●		●	●	
194A	4–bit bidirectional universal shift register		●			
195	4–bit parallel access shift register	●		●	●	
195A	4–bit parallel access shift register		●			
198	8–bit bidirectional universal shift register				●	
199	8–bit parallel–access shift register	●			●	
225	FIFO			●	●	
295B	4–bit shift register (3–state)		●			
298	quad 2–port register	●	●		●	
299	octal shift/storage register (3–state)				●	
322	octal shift/storage register (3–state)				●	
323	octal shift/storage register (3–state)				●	
350	4–bit shifter (3–state)			●	●	
395	4–bit cascadable shift register (3–state)				●	
395A	4–bit cascadable shift register (3–state)		●		●	
398	quad 2–port register true				●	
399	quad 2–port register true				●	
595	8–bit shift register with output latch				●	
597	8–bit shift register with input latch				●	
598	8–bit shift register with input latch				●	
646	octal bus transceiver and register (3–state)				●	
647	octal bus transceiver and register (open collector)				●	
648	octal bus transceiver and register (3–state)				●	
649	octal bus transceiver and register (open collector)				●	
651	octal transceiver/register, inverting (3–state)				●	
652	octal transceiver/register, non–inverting (3–state)				●	
653	octal transceiver/register, inverting (open collector)				●	
654	octal transceiver/register, non–inverting (open collector)				●	
670	4x4 register file (3–state)		●		●	
673	16–bit serial–in, serial/parallel–out shift register (3–state)				●	
673A	16–bit serial–in, serial/parallel–out shift register (3–state)				●	
674	16–bit serial/parallel–in,serial out shift register (3–state)				●	
675	16–bit serial–in, serial/parallel–out shift register (3–state)				●	
676	16–bit serial/parallel–in,serial out				●	
821	10–bit register, non–inverting (3–state)				●	

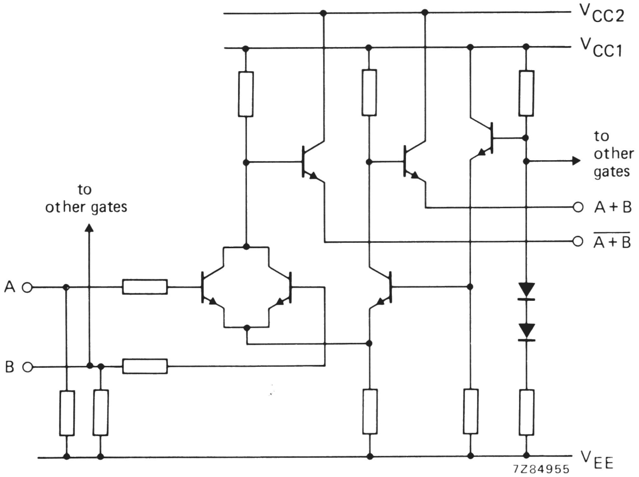
N74 SERIES		STD	LS	S	F	ALS
REGISTERS (cont.)						
822	10–bit register, inverting (3–state)				●	
823	9–bit register, non–inverting (3–state)				●	
824	9–bit register, inverting (3–state)				●	
825	9–bit register, non–inverting (3–state)				●	
826	9–bit register, inverting (3–state)				●	
SCHMITT TRIGGERS						
13	dual 4–input NAND Schmitt trigger	●	●		●	
14	hex inverter Schmitt trigger	●	●		●	
132	quad 2–input NAND Schmitt trigger	●	●		●	
SELECTORS						
157	quad 2–input data selector/multiplexer; non–inverting	●	●	●	●	●
157A	quad 2–input data selector/multiplexer; non–inverting				●	
158	quad 2–input data selector/multiplexer; inverting	●	●	●	●	●
158A	quad 2–input data selector/multiplexer; inverting				●	
257	quad 2–line to 1–line data selector/multiplexer (3–state)			●	●	●
257A	quad 2–line to 1–line data selector/multiplexer (3–state)		●		●	
258	quad 2–line to 1–line data selector/multiplexer (3–state)			●	●	●
258A	quad 2–line to 1–line data selector/multiplexer (3–state)		●		●	
SPECIAL FUNCTIONS						
384	8–bit serial/parallel two's complement multiplier				●	
429	FIFO RAM controller (64K)		●			
630	memory error detector/corrector (3–state)				●	
631	memory error detector/corrector (open collector)				●	
764	dual port RAM controller		●		●	
764–1	DRAM dual–ported controller				●	
764A	DRAM dual ported controller				●	
765	dual port RAM controller without latch		●		●	
765–1	DRAM dual–ported controller without latch				●	
765A	DRAM dual ported controller without latch				●	
784	8–bit serial multiplier and adder substractor				●	
786	4–input asynchronous bus arbiter				●	
838	microprogram sequence controller				●	
1761	DRAM and interrupt vector controller				●	
1762	1 M–bit memory address controller				●	
1763	1 M–bit intelligent DRAM controller				●	
1764	1 M–bit DRAM dual–ported controller with latch				●	
1764–1	1 M–bit DRAM dual–ported controller with latch				●	
1765	1 M–bit DRAM dual–ported controller without latch				●	
1765–1	1 M–bit DRAM dual–ported controller without latch				●	
1801	bit stream manager (encoder/decoder)		●			
1802	bit stream manager (serializer/de–serializer)		●			

N74 SERIES		STD	LS	S	F	ALS
TRANCEIVERS						
242	quad bus inverting transceiver (3–state)		●	●	●	
243	quad transceiver (3–state)		●	●	●	
245	octal bus transceiver (3–state)		●		●	
545	octal bus transceiver (3–state)				●	
550	octal registered transceiver (AMD2950)				●	
551	octal registered transceiver (AMD2951)				●	
552	octal registered transceiver with status flags				●	
588	GPIB compatible octal transceiver				●	
620	octal bus transceiver (3–state)		●		●	
620A	octal bus transceiver (3–state)					●
620A–1	octal bus transceiver (3–state)					●
621	octal bus transceiver (open collector)		●		●	
622	octal bus transceiver (open collector)		●		●	
623	octal bus transceiver (3–state)		●		●	
623A	octal bus transceiver (3–state)					●
623A–1	octal bus transceiver (3–state)					●
640	octal bus transceiver, inverting (3–state)		●		●	
640–1	inverting octal bus transceiver (3–state)		●			
641	octal bus transceiver (open collector)		●		●	
641–1	octal bus transceiver (open collector)		●			
642	inverting octal bus transceiver (open collector)		●		●	
642–1	inverting octal bus transceiver (open collector)		●			
645	octal bus transceiver (3–state)		●			
645–1	octal bus transceiver (3–state)		●			
646	octal bus transceiver and register (3–state)				●	
647	octal bus transceiver and register (open collector)				●	
648	octal bus transceiver and register (3–state)				●	
649	octal bus transceiver and register (open collector)				●	
651	octal transceiver/register, inverting (3–state)				●	
652	octal transceiver/register, non–inverting (3–state)				●	
653	octal transceiver/register, inverting (open collector)				●	
654	octal transceiver/register, non–inverting (open collector)				●	
657	octal bus transceiver with parity generator checker				●	
861	10–bit transceiver, non–inverting				●	
862	10–bit transceiver, inverting				●	
863	9–bit transceiver, non–inverting (3–state)				●	
864	9–bit transceiver, inverting (3–state)				●	
1242	quad transceiver; inverting (3–state) light load				●	
1243	quad transceiver (3–state); light load				●	
2952	8–bit transceiver; non–inverting (3–state)				●	
2953	8–bit transceiver; inverting (3–state)				●	
30245	octal transceiver/30 Ohm transmission line driver; open collector				●	
30640	octal transceiver, 30 Ohm transmission driver; inverting; open collector				●	

ECL 10 000 FAMILY SPECIFICATIONS

The 10K family of ECL silicon monolithic integrated circuits is designed for high speed central processors and digital communication systems.
With 2 ns typical propagation delay and only 25 mW power dissipation per gate, this family offers an excellent speed–power product and therefore is recommended for large high–speed system design.

Basic gate circuit



Family ratings

Limiting values in accordance with the Absolute Maximum System (IEC134)

Supply voltage (DC)	V_{EE}	max. −8.0	V
Input voltage range	V_I	0 to V_{EE}	
Output current	I_O	max. 50	mA
Storage temperature range	T_{stg}	−55 to +150	°C

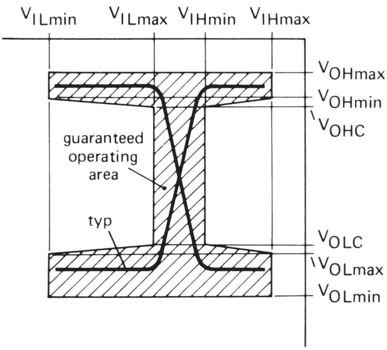
DC family characteristics

V_{CC} = ground; V_{EE} = −5.2 V; R_L = 50 Ohm to −2 V

Each 10K circuit has been designed to meet the DC specifications shown in the test table below, after thermal equilibrium has been established.
The circuit is in a test socket or mounted on a printed–circuit board and transverse air flow > 2.5 m/s is maintained.
Test values are given in the table and defined in the figure.

Test table

T_{amb}	−30	+25	+85 °C	unit
V_{IHA}	−890	−810	−700	mV
V_{IHB}	−1205	−1105	−1035	mV
V_{ILA}	−1500	−1475	−1440	mV
V_{ILB}	−1890	−1850	−1825	mV


7Z55963.3
V_{ILmin}
V_{ILmax}
V_{IHmin}
V_{IHmax}
V_{OHmax}
V_{OHmin}
V_{OHC}
guaranteed operating area
typ
V_{OLC}
V_{OLmax}
V_{OLmin}

parameter	symbol	T_{amb} −30 °C	T_{amb} +25 °C	T_{amb} +75 °C	unit
Output voltage HIGH	V_{OHA} V_{OHB}	−890 −1060	−810 −960	−700 −890	mV mV
Output voltage LOW	V_{OLA} V_{OLB}	−1675 −1890	−1650 −1850	−1615 −1825	mV mV
Output threshold voltage HIGH	V_{OHC}	−1080	−980	−910	mV
Output threshold voltage LOW	V_{OLC}	−1655	−1630	−1595	mV

ECL 10 000 FAMILY SURVEY

Type numbers have a suffix which signifies the type of package:
N = plastic DIL; F = ceramic (cerdip) DIL

AMPLIFIERS

10216	triple differential amplifier

ARITHMETIC ICs

10160	12–bit parity checker/generator
10179	look–ahead carry block
10181	4–bit arithmetic logic unit

BUFFERS

10188	hex buffer (non–inverting) with enable

BUS ICs

10123	triple bus driver (4–3–3–input; output NOR)
10192	quadruple current–mode bus driver

COUNTERS

10136	universal hexadecimal counter
10137	universal decade counter

DECODERS

10161	3–bit decoder with two enable inputs (1 of 8 lines LOW)
10162	3–bit decoder with two enable inputs (1 of 8 lines HIGH)
10171	dual 2–bit decoder (1 of 4 lines LOW)
10172	dual 2–bit decoder (1 of 4 lines HIGH)

DRIVERS

10110	dual 3–input/3–output OR gate (line driver)
10111	dual 3–input/3–output NOR gate (line driver)
10210	high speed dual 3–input/3–output OR gate
10211	high speed dual 3–input/3–output NOR gate

ENCODERS

10165	8–input priority encoder

FLIP–FLOPS

D–type

10131	dual D–type master–slave flip–flop
10176	hex D–type master–slave flip–flop
10231	high speed dual D–type master–slave flip–flop

JK

10135	dual JK master–slave flip–flop

GATES

AND

10104	quadruple 2–input, 3 AND and 1 AND/NAND gate
10108	dual 3–input AND/NAND gate

Complex

10117	dual 2–wide 2–3–input OR–AND/OR–AND–INVERT gate
10118	dual 2–wide 3–input OR–AND gate
10119	4–wide 4–3–3–3–input OR–AND gate

EXCLUSIVE–OR

10107	triple 2–input EXCLUSIVE–OR/EXCLUSIVE–NOR gate
10113	quadruple EXCLUSIVE–OR gate (with enable)

EXCLUSIVE–NOR

10107	triple 2–input EXCLUSIVE–OR/EXCLUSIVE–NOR gate

NAND

10104	quadruple 2–input, 3 AND and 1 AND/NAND gate
10108	dual 3–input AND/NAND gate

NOR

10100	quadruple 3–input NOR gate (1 input common)
10101	quadruple 2–input OR/NOR gate (1 input common)
10102	quadruple 2–input, 3 NOR and 1 OR/NOR gate
10103	quadruple 2–input, 3 OR and 1 OR/NOR gate
10105	triple 2–3–2 input OR/NOR gate
10106	triple 4–3–3 input NOR gate
10109	dual 4–5 input OR/NOR gate

OR

10101	quadruple 2–input OR/NOR gate (1 input common)
10102	quadruple 2–input, 3 NOR and 1 OR/NOR gate
10103	quadruple 2–input, 3 OR and 1 OR/NOR gate
10105	triple 2–3–2 input OR/NOR gate
10109	dual 4–5 input OR/NOR gate

INVERTERS

10189	hex inverter with enable

LATCHES

10130	dual D–type latch
10133	quadruple latch with D–type inputs and enable outputs
10134	dual 2–input multiplexer with clocked D–type latches
10175	quintuple D–type latch with common reset and two wired–OR common clock inputs

MULTIPLEXERS

10134	dual 2–input multiplexer with clocked D–type latches
10158	quadruple 2–to–1 multiplexer (non–inverting)
10159	quadruple 2–to–1 multiplexer (inverting)
10164	8–input multiplexer with enable input
10173	quadruple 2–input multiplexer with latched outputs
10174	dual 4–to–1 multiplexer (with enable)

REGISTERS

10141	4–bit universal shift register

TRANSLATORS

10124	quadruple TTL to ECL translator
10125	quadruple ECL to TTL translator

MEMORIES
PROM

10149	1024–bit, 4–bits per word PROM
10149A	1024–bit, 4–bits per word PROM

RAM

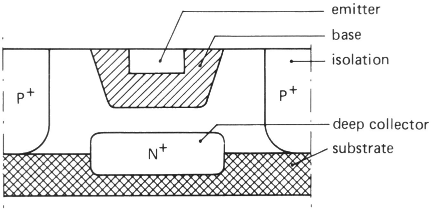
10422B	256x4–bit RAM
10422C	256x4–bit RAM

RECEIVERS

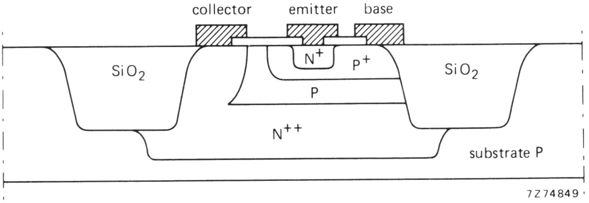
10114	triple line receiver (output OR/NOR)
10115	quadruple line receiver (output OR)
10116	triple line receiver (output OR/NOR)

ECL 100 000 FAMILY SPECIFICATIONS

To satisfy the needs of new generations of computer and telecommunication systems in standard and LSI circuit design, a new technological process has been developed using oxide lateral isolation. The process is called SUBILO and permits the manufacture of integrated circuits with ultra–high speeds and high integration density.
Instead of conventional planar junction isolation technology, SUBILO uses a process that results in a considerable reduction in transistor area and an increased integration density.
By using an increase in silicon oxide instead of isolation diffusion 'p', and removing the part between the emitter and isolation oxide, SUBILO technology results in a further reduction of transistor area. At the same time, the collector–base capacitance decreases, which is an important improvement in the dynamic performance of the transistor.



Junction–isolated PLANAR technique used for ECL 10 000.



The SUBILO process uses silicon oxide between devices instead of the p^+ regions used in the planar process.

Planar process in comparison with SUBILO technology

	planar	SUBILO	unit
Transistor area	3000	500	μm^2
Transition frequency	1.5	4.5	GHz
Application	ECL 10 000	ECL 100 000	

Family ratings

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Supply voltage (DC): V_{EE} max. -7 V
Input voltage range: $V_I = 0$ to V_{EE} if $V_{EE} > -6$ V; 0 to $-6\text{ V} > V_{EE} > -7$ V
Output current: I_O max. 55 mA
Storage temperature range: T_{stg} -55 to $+150$ °C

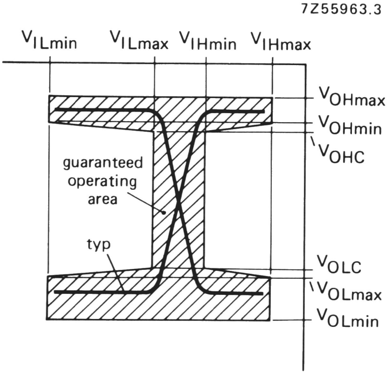
DC family characteristics

V_{CC} = ground; V_{EE} = −4.5 V; T_{amb} = 0 to +85 °C; R_L = 50 Ohm to −2 V.

Each 100K circuit has been designed to meet the DC specifications shown in the test table, after thermal equilibrium has been established. The circuit is in a test socket or mounted on a printed–circuit and transverse air flow > 2.5 m/s is maintained.
Test values are given in the table and defined in the figure.

Test table

parameter	symbol	value	unit
Input voltage HIGH	V_{IHA} V_{IHB}	−880 −1165	mV mV
Input voltage LOW	V_{ILA} V_{ILB}	−1475 −1810	mV mV
Output voltage HIGH	V_{OHA} V_{OHB}	−880 −1025	mV mV
Output voltage LOW	V_{OLA} V_{OLB}	−1620 −1810	mV mV
Output threshold voltage			
HIGH	V_{OHC}	−1035	mV
LOW	V_{OLC}	−1610	mV


7Z55963.3
VILmin
VILmax
VIHmin
VIHmax
VOHmax
VOHmin
VOHC
guaranteed operating area
typ
VOLC
VOLmax
VOLmin

ECL 100 000 FAMILY SURVEY

ARITHMETIC ICs

100160	dual 9–bit parity generator/8–bit comparator
100179	high speed carry look ahead generator
100180	fast 6–bit adder
100181	4–bit ALU binary/decimal

BUFFERS

100122	9–bit buffer gate

COMPARATORS

100166	9–bit comparator

DECODERS

100170	universal demultiplexer/decoder

DEMULTIPLEXERS

100170	universal demultiplexer/decoder

DRIVERS

100112	quadruple double fan–out OR/NOR gate
100113	quadruple fan–out OR/NOR gate
100123	hex bus driver
100126	9–bit buffer gate

ENCODERS

100165	universal priority encoder

FLIP–FLOPS

D–type

100131	triple D master–slave flip–flop
100150	hex D latch flip–flop
100151	hex D master–slave flip–flop
100231	triple D master–slave flip–flop (high speed version of 100131)

GATES

Complex

100117	triple 1–2–2 input OR/AND–OR/NAND gate
100118	2–4–4–4–5 input OR/AND–OR/NAND gate

EXCLUSIVE–OR

100107	quintuple EXCLUSIVE OR/NOR gate with compare

EXCLUSIVE–NOR

100107	quintuple EXCLUSIVE OR/NOR gate with compare

GATES (cont.)

NOR

100101	triple 5–input OR/NOR gate
100102	quintuple 2–input OR/NOR gate with common enable

OR

100101	triple 5–input OR/NOR gate
100102	quintuple 2–input OR/NOR gate with common enable

LATCHES

100155	quadruple 2–way multiplexer latch
100175	5–bit 100K to 10K interface with latch

MULTIPLEXERS

100155	quadruple 2–way multiplexer latch
100163	dual 8–bit multiplexer
100164	16–input multiplexer
100171	triple bit 4–way multiplexer

REGISTERS

100136	multipurpose counting register
100141	8–bit universal shift register

SPECIAL FUNCTIONS

100158	8–bit shift matrix

TRANSLATORS

100175	5–bit 100K to 10K interface with latch
100255	5–bit ECL/TTL interface

MEMORIES

PROM

100149	1024–bit, 4–bits per word PROM
100149A	1024–bit, 4–bits per word PROM

RAM

100422B	256x4–bit RAM
100422C	256x4–bit RAM
100470A	4096x1–bit RAM
100474A	1024x4–bit RAM

RECEIVERS

100114	quintuple differential line receiver

ARITHMETIC ICs

8262	8–bit parity generator and checker

BUFFERS

N8T95	high–speed hex buffer (3–state)
N8T96	high–speed hex inverter (3–state)
N8T97	high speed hex buffer (3–state)
N8T98	high–speed hex inverter (3–state)

BUS ICs

N8T09	quad 3–state bus driver
N8T26A	quad inverting bus transceiver (3–state)
N8T28	quad non–inverting bus transceiver (3–state)
N8T34	quad bus transceiver (3–state)
N8T37	hex bus receiver/Schmitt trigger
N8T38	quad bus transceiver (open collector)
N8T126	quad bus driver/receiver (inverting)
N8T128	quad bus driver/receiver (non–inverting)
N8T129	quad bus driver/receiver (non–inverting)
N8T380	quad bus receiver with hysteresis/Schmitt trigger

COMPARATORS

9324	5–bit comparator

DRIVERS

N8T13	dual low impedance line driver
N8T15	dual communications line driver
N8T16	dual communications line receiver
N8T23	dual IBM 360/370 line driver

FLIP–FLOPS

D–type

N8TS808	octal D–type flip–flop (3–state)
N8T10	quad 3–state D–type bus latch

GATES

EXCLUSIVE–NOR

8242	quad EXCLUSIVE–NOR gate

NAND

8881	quad 2–input NAND (open collector)

LATCHES

N8TS805	octal transparent latch (3–state)
N8TS807	octal transparent latch (3–state)
N8T3404	high–speed 6–bit latch
9334	8–bit addressable latch

MULTIPLEXERS

8234	2–input, 4–bit digital multiplexer
8266	2–input, 4–bit digital multiplexer
9309	dual 4–input multiplexer

MULTIVIBRATORS

Monostable

9602	dual monostable multivibrator

One–shot

N8T20	bidirectional one shot multivibrator

RECEIVERS

N8T24	triple IBM 360/370 line receiver

REGISTERS

8271	4–bit shift register
8273	10–bit serial–in/parallel–out shift register
8274	10–bit parallel–in/serial–out shift register

SPECIAL FUNCTIONS

N8T31	transparent I/O port; 8–bit bidirectional
N8T32	addressable I/O port; 8–bit bidirectional, synchronous
N8T36	addressable I/O port; 8–bit bidirectional, asynchronous
23 101	high level 16–to–8 connection matrix
231 101	high level 16–to–8 connection matrix
3001	microprogram control unit
3002	central processing element

TIMING ICs

N8T20	bidirectional one shot multivibrator

TRANCEIVERS

N8T26A	quad inverting bus transceiver (3–state)
N8T28	quad non–inverting bus transceiver (3–state)
N8T34	quad bus transceiver (3–state)
N8T38	quad bus transceiver (open collector)
N8T125	octal transceiver (inverting)
N8T245	octal transceiver
N8X41	auto–directional bus transceiver

DIGITAL SIGNAL PROCESSORS

PCB5010	single–chip digital signal processor; 8 MHz; on–chip program memory 987x40–bit ROM (mask programmable), 32x40–bit RAM (loaded via bus), 5x40–bit ROM (fixed load–RAM program); on–chip data memory 512x16–bit ROM (mask programmable), 2x(128x16–bit) static RAM
PCB5011	single–chip digital signal processor; 8 MHz; ROMless bond–out version; external program memory 1024x40–bit (expandable to 64Kx40–bit); external data memory 512x16–bit (read and write possible) plus 2x(128x16–bit) on–chip static RAM
PCF5010	single–chip digital signal processor; 8 MHz; on–chip program memory 987x40–bit ROM (mask programmable), 32x40–bit RAM (loaded via bus), 5x40–bit ROM (fixed load–RAM program); on–chip data memory 512x16–bit ROM (mask programmable), 2x(128x16–bit) static RAM
PCF5011	single–chip digital signal processor; 8 MHz; ROMless bond–out version; external program memory 1024x40–bit (expandable to 64Kx40–bit); external data memory 512x16–bit (read and write possible); plus 2x(128x16–bit) on–chip static RAM

EPROM

27C64A	65,536–bit CMOS EPROM (8Kx8)
27C256	262,144–bit CMOS EPROM (32Kx8)
27HC641	65,536–bit CMOS EPROM (8Kx8)

EEPROM

PCF8582A	256x8–bit EEPROM; I^{2}C bus

PROM

82HS187	8192–bit bipolar PROM (1024x8)
82HS187A	8192–bit bipolar PROM (1024x8)
82HS189	8192–bit bipolar PROM (1024x8)
82HS189A	8192–bit bipolar PROM (1024x8)
82HS191	16,384–bit bipolar PROM (2048x8)
82HS195	16,384–bit bipolar PROM (4096x4)
82HS195A	16,384–bit bipolar PROM (4096x4)
82HS195B	16,384–bit bipolar PROM (4096x4)
82HS321	32,768–bit bipolar PROM (4096x8)
82HS321A	32,768–bit bipolar PROM (4096x8)
82HS321B	32,768–bit bipolar PROM (4096x8)
82HS641	65,536–bit bipolar PROM (8192x8)
82HS641A	65,536–bit bipolar PROM (8192x8)
82HS641B	65,536–bit bipolar PROM (8192x8)
82HS1281	131,072–bit bipolar PROM (16384x8)
82LS135	2048–bit bipolar PROM (256x8)
82S23	256–bit bipolar PROM (32x8)
82S23A	256–bit bipolar PROM (32x8)
82S115	4096–bit bipolar PROM (512x8)
82S123	256–bit bipolar PROM (32x8)
82S123A	256–bit bipolar PROM (32x8)
82S126	1024–bit bipolar PROM (256x4)
82S126A	1024–bit bipolar PROM (256x4)
82S129	1024–bit bipolar PROM (256x4)
82S129A	1024–bit bipolar PROM (256x4)
82S130	2048–bit bipolar PROM (512x4)
82S130A	2048–bit bipolar PROM (512x4)
82S131	2048–bit bipolar PROM (512x4)
82S131A	2048–bit bipolar PROM (512x4)
82S135	2048–bit bipolar PROM (256x8)
82S137	4096–bit bipolar PROM (1024x4)
82S137A	4096–bit bipolar PROM (1024x4)
82S137B	4096–bit bipolar PROM (1024x4)
82S137C	4096–bit bipolar PROM (1024x4)
82S141	4096–bit bipolar PROM (512x8)
82S141A	4096–bit bipolar PROM (512x8)
82S147	4096–bit bipolar PROM (512x8)
82S147A	4096–bit bipolar PROM (512x8)
82S147B	4096–bit bipolar PROM (512x8)
82S181	8192–bit bipolar PROM (1024x8)
82S181A	8192–bit bipolar PROM (1024x8)
82S181C	8192–bit bipolar PROM (1024x8)
82S183	8192–bit bipolar PROM (1024x8)
82S185	8192–bit bipolar PROM (2048x4)
82S185A	8192–bit bipolar PROM (2048x4)
82S185C	8192–bit bipolar PROM (2048x4)
82S191	16,384–bit bipolar PROM (2048x8)
82S191A	16,384–bit bipolar PROM (2048x8)
82S191C	16,384–bit bipolar PROM (2048x8)

PROM (cont.)

82US23	256–bit bipolar PROM (32x8)
82US123	256–bit bipolar PROM (32x8)

RAM

FCB61C61–35	65536x1–bit high–speed CMOS static RAM; access time 35 ns
FCB61C61–45	65536x1–bit high–speed CMOS static RAM; access time 45 ns
FCB61C61–55	65536x1–bit high–speed CMOS static RAM; access time 55 ns
FCB61C61L–35	65536x1–bit high–speed CMOS low–power static RAM; access time 35 ns
FCB61C61L–45	65536x1–bit high–speed CMOS low–power static RAM; access time 45 ns
FCB61C61L–55	65536x1–bit high–speed CMOS low–power static RAM; access time 55 ns
FCB61C62–35	16384x4–bit high–speed CMOS static RAM; access time 35 ns
FCB61C62–45	16384x4–bit high–speed CMOS static RAM; access time 45 ns
FCB61C62–55	16384x4–bit high–speed CMOS static RAM; access time 55 ns
FCB61C62L–35	16384x4–bit high–speed CMOS low–power static RAM; access time 35 ns
FCB61C62L–45	16384x4–bit high–speed CMOS low–power static RAM; access time 45 ns
FCB61C62L–55	16384x4–bit high–speed CMOS low–power static RAM; access time 55 ns
FCB61C65–45	8192x8–bit high–speed CMOS static RAM; access time 45 ns
FCB61C65–55	8192x8–bit high–speed CMOS static RAM; access time 55 ns
FCB61C65–70	8192x8–bit high–speed CMOS static RAM; access time 70 ns
FCB61C65L–45	8192x8–bit high–speed CMOS low–power static RAM; access time 45 ns
FCB61C65L–55	8192x8–bit high–speed CMOS low–power static RAM; access time 55 ns
FCB61C65L–70	8192x8–bit high–speed CMOS low–power static RAM; access time 70 ns
N8X350	256x8–bit bipolar RAM
PCD5101	256x4–bit static RAM
PCD5114	1024x4–bit static RAM
PCF8570	256x8–bit static RAM; I²C bus
PCF8570C	256x8–bit static RAM; I²C bus; different slave address
PCF8571	128x8–bit static RAM; I²C bus
PCF8583	clock calendar with 256x8–bit static RAM; I²C bus
82LS16	256–bit bipolar RAM (256x1)
82S09	576–bit bipolar RAM (64x9)
82S09A	576–bit bipolar RAM (64x9)
82S16	256–bit bipolar RAM (256x1)
82S19	576–bit bipolar RAM (64x9)
82S25	64–bit bipolar RAM (16x4)
82S212	2304–bit bipolar RAM (256x9)
82S212A	2304–bit bipolar RAM (256x9)
3101A	64–bit bipolar RAM (16x4)

BIPOLAR 8–BIT

N8T31	transparent I/O port; 8–bit bidirectional
N8T32	addressable I/O port; 8–bit bidirectional, synchronous
N8T36	addressable I/O port; 8–bit bidirectional, asynchronous
N8X01A	CRC generator/checker
N8X02A	control store sequencer
N8X41	auto–directional bus transceiver
N8X60	FIFO RAM controller (4K RAM)
N8X305	microcontroller; 200 ns cycle time
N8X310	interrupt controller
N8X320	bus interface array; 2–port RAM for 8/16–bit mailbox interface
N8X350	256x8–bit bipolar RAM
N8X371	transparent I/O port; 8–bit bidirectional
N8X372	addressable I/O port; 8–bit bidirectional, synchronous
N8X376	addressable I/O port; 8–bit bidirectional, asynchronous
N8X400AS1	cross–assembler fortress for N8X401 (written in Pascal for IBM PC)
N8X400KT1	development board for N8X401
N8X401	8–bit bipolar microcontroller
N8X450	256–bit bipolar RAM (32x8)
2960	error detection/correction unit
2964B	dynamic memory controller
9401	CRC generator/checker
9403	64–bit FIFO buffer memory (16x4)

CMOS 8–BIT

PCA80C31BH–3	microcontroller; 128x8 RAM; 1.2 to 12 MHz; –40 to +110 °C
PCA80C39	microcontroller; 128x8 RAM; 1.0 to 15 MHz; –40 to +110 °C
PCA80C49	microcontroller; 128x8 RAM; 2Kx8 ROM; 1.0 to 15 MHz; –40 to +110 °C
PCA80C51BH–3	microcontroller; 128x8 RAM; 4Kx8 ROM; 1.2 to 12 MHz; –40 to +110 °C
PCA80C552	microcontroller; 256x8 RAM; 16–bit capture/compare timer/counter; watch–dog timer; 2 pulse–width modulated signals; 8–bit input to 10–bit ADC; I^2C bus; 1.2 to 12 MHz; –40 to +110 °C
PCA80C562	microcontroller; 256x8 RAM; 16–bit capture/compare timer/counter; watch–dog timer; 2 pulse–width modulated signals; 8–bit input to 8–bit ADC; 1.2 to 12 MHz; –40 to +110 °C
PCA80C652	microcontroller; 256x8 RAM; serial I/O; UART; I^2C bus; 1.2 to 12 MHz; –40 to +110 °C
PCA83C552	microcontroller; 256x8 RAM; 8Kx8 ROM; 16–bit capture/compare timer/counter; watch–dog timer; 2 pulse–width modulated signals; 8–bit input to 10–bit ADC; I^2C bus; 1.2 to 12 MHz; –40 to +110 °C

CMOS 8–BIT (cont.)

PCA83C562	microcontroller; 256x8 RAM; 8Kx8 ROM; 16–bit capture/compare timer/counter; watch–dog timer; 2 pulse–width modulated signals; 8–bit input to 8–bit ADC; 1.2 to 12 MHz; –40 to +110 °C
PCA83C652	microcontroller; 256x8 RAM; 8Kx8 ROM; serial I/O; UART; I^{2}C bus; 1.2 to 12 MHz; –40 to +110 °C
PCA83C654	microcontroller; 256x8 RAM; 16Kx8 ROM; serial I/O; UART; I^{2}C bus; 1.2 to 12 MHz; –40 to +110 °C
PCB80C31BH–3	microcontroller; 128x8 RAM; 1.2 to 16 MHz; 0 to +70 °C
PCB80C39	microcontroller; 128x8 RAM; 1.0 to 15 MHz; 0 to +70 °C
PCB80C49	microcontroller; 128x8 RAM; 2Kx8 ROM; 1.0 to 15 MHz; 0 to +70 °C
PCB80C51BH–3	microcontroller; 128x8 RAM; 4Kx8 ROM; 1.2 to 16 MHz; 0 to +70 °C
PCB80C552	microcontroller; 256x8 RAM; 16–bit capture/compare timer/counter; watch–dog timer; two pulse–width modulated signals; 8–bit input to 10–bit ADC; I^{2}C bus; 1.2 to 12 MHz; 0 to +70 °C
PCB80C562	microcontroller; 256x8 RAM; 16–bit capture/compare timer/counter; watch–dog timer; 2 pulse–width modulated signals; 8–bit input to 8–bit ADC; 1.2 to 12 MHz; 0 to +70 °C
PCB80C652	microcontroller; 256x8 RAM; serial I/O; UART; I^{2}C bus; 1.2 to 12 MHz; 0 to +70 °C
PCB80C851	microcontroller; 128x8 RAM; 256x8 EEPROM; 1.2 to 12 MHz; 0 to +70 °C
PCB83C552	microcontroller; 256x8 RAM; 8Kx8 ROM; 16–bit capture/compare timer/counter; watch–dog timer; two pulse–width modulated signals; 8–bit to 10–bit ADC; I^{2}C bus; 1.2 to 12 MHZ; 0 to +70 °C
PCB83C562	microcontroller; 256x8 RAM; 8Kx8 ROM; 16–bit capture/compare timer/counter; watch–dog timer; 2 pulse–width modulated signals; 8–bit input to 8–bit ADC; 1.2 to 12 MHz; 0 to +70 °C
PCB83C652	microcontroller; 256x8 RAM; 8Kx8 ROM; serial I/O; UART; I^{2}C bus; 1.2 to 12 MHz; 0 to +70 °C
PCB83C654	microcontroller; 256x8 RAM; 16Kx8 ROM; serial I/O; UART; I^{2}C bus; 1.2 to 12 MHz; 0 to +70 °C
PCB83C851	microcontroller; 128x8 RAM; 4Kx8 ROM; 256x8 EEPROM; 1.2 to 12 MHz; 0 to +70 °C
PCD3315C	microcontroller for telephone sets; 160x8 RAM; 1.5Kx8 ROM; 20 I/O lines; I^{2}C bus
PCD3343	microcontroller for telephone sets; 224x8 RAM; 3Kx8 ROM; 20 I/O lines; I^{2}C bus
PCD3348	microcontroller for telephone sets; 256x8 RAM; 8Kx8 ROM; 20 I/O lines; I^{2}C bus
PCF80C31BH–3	microcontroller; 128x8 RAM; 1.2 to 12 MHz; –40 to + 85 °C
PCF80C39	microcontroller; 128x8 RAM; 1.0 to 15 MHz; –40 to +85 °C
PCF80C49	microcontroller; 128x8 RAM; 2Kx8 ROM; 1.0 to 15 MHz; –40 to +85 °C
PCF80C51BH–3	microcontroller; 128x8 RAM; 4Kx8 ROM; 1.2 to 12 MHz; –40 to +85 °C

CMOS 8–BIT (cont.)

PCF80C552	microcontroller; 256x8 RAM; 16–bit capture/compare timer/counter; watch–dog timer; 2 pulse–width modulated signals; 8–bit input to 10–bit ADC; I^2C bus; 1.2 to 12 MHz; –40 to +85 °C
PCF80C562	microcontroller; 256x8 RAM; 16–bit capture/compare timer/counter; watch–dog timer; 2 pulse–width modulated signals; 8–bit input to 8–bit ADC; 1.2 to 12 MHz; –40 to +85 °C
PCF80C652	microcontroller; 256x8 RAM; serial I/O; UART: I^2C bus; 1.2 to 12 MHz; –40 to +85 °C
PCF80C851	microcontroller; 128x8 RAM; 256x8 EEPROM; 1.2 to 12 MHz; –40 to +85 °C
PCF83C552	microcontroller; 256x8 RAM; 8Kx8 ROM; 16–bit capture/compare timer/counter; watch–dog timer; 2 pulse–width modulated signals; 8–bit input to 10–bit ADC; I^2C bus; 1.2 to 12 MHz; –40 to +85 °C
PCF83C562	microcontroller; 256x8 RAM; 8Kx8 ROM; 16–bit capture/compare timer/counter; watch–dog timer; 2 pulse–width modulated signals; 8–bit input to 8–bit ADC; 1.2 to 12 MHz; –40 to +85 °C
PCF83C652	microcontroller; 256x8 RAM; 8Kx8 ROM; serial I/O; UART; I^2C bus; 1.2 to 12 MHz; –40 to +85 °C
PCF83C654	microcontroller; 256x8 RAM; 16Kx8 ROM; serial I/O; UART; I^2C bus; 1.2 to 12 MHz; –40 to +85 °C
PCF83C851	microcontroller; 128x8 RAM; 4Kx8 ROM; 256x8 EEPROM; 1.2 to 12 MHz; –40 to +85 °C
PCF84C00	microcontroller; 256x8 RAM; bond–out version PCF84CXX family; I^2C bus
PCF84C12	low cost microcontroller; 64x8 RAM; 1Kx8 ROM
PCF84C21	microcontroller; 64x8 RAM; 2Kx8 ROM; plus 8–bit LED driver; I^2C bus; –40 to +85 °C
PCF84C22	low cost microcontroller; 64x8 RAM; 2Kx8 ROM
PCF84C41	microcontroller; 128x8 RAM; 4Kx8 ROM; plus 8–bit LED driver; I^2C bus; –40 to +85 °C
PCF84C42	low cost microcontroller; 64x8 RAM; 4K8 ROM
PCF84C81	microcontroller; 256x8 RAM; 8Kx8 ROM; plus 8–bit LED driver; I^2C bus; –40 to +85 °C
PCF84C85	microcontroller; 256x8 RAM; 8Kx8 ROM; 32 I/O; plus 8–bit LED driver; I^2C bus; –40 to +85 °C
PCF84C121	microcontroller; 256x8 RAM; 1Kx8 ROM; 8x8 EEPROM
PCF84C230	microcontroller; 64x8 RAM; 2Kx8 ROM; with LCD driver
PCF84C270	microcontroller with keyboard scanner; 128x8 RAM; 2Kx8 ROM; for capacitive matrix–type keyboards
PCF84C271	microcontroller with keyboard scanner; 128x8 RAM; 2Kx8 ROM; for mechanical matrix–type keyboards
PCF84C430	microcontroller with LCD driver; 128x8 RAM; 4Kx8 ROM; I^2C bus
PCF84C470	microcontroller with keyboard scanner; 128x8 RAM; 4Kx8 ROM; for capacitive matrix–type keyboards
PCF84C633	microcontroller; 256x8 RAM; 8Kx8 ROM; plus 16–bit timers; LCD driver
PCF84C853	microcontroller; 256x8 RAM; 8Kx8 ROM; plus 16–bit timers
SC80C451	I/O expanded microcontroller; 128x8 RAM; 0.5 to 16 MHz; –40 to +85 °C

CMOS 8–BIT (cont.)

SC83C451	I/O expanded microcontroller; 128x8 RAM; 4Kx8 ROM; 0.5 to 16 MHz; –40 to +85 °C
SC83C751	microcontroller; 64x8 RAM; 2Kx8 ROM; 16–bit timer/counter; 2x8–bit I/O; I^2C bus; 0.5 to 16 MHz
SC87C51	microcontroller; 128x8 RAM; 4Kx8 EPROM; 0.5 to 12 MHz
SC87C451	I/O expanded microcontroller; 128x8 RAM; 4Kx8 EPROM; 0.5 to 16 MHz
SC87C751	microcontroller; 64x8 RAM; 2Kx8 EPROM; 16–bit timer/counter; 2x8–bit I/O; I^2C bus; 0.5 to 16 MHz

NMOS 8–BIT

MAB8031AH–2	microcontroller; 128x8 RAM; 3.5 to 15 MHz; 0 to +70 °C
MAB8032AH	microcontroller; 256x8 RAM; 3.5 to 12 MHz; 0 to +70 °C
MAB8035HL	microcontroller; 64x8 RAM; 1.0 to 11 MHz; 0 to +70 °C
MAB8039HL	microcontroller; 128x8 RAM; 1.0 to 11 MHz; 0 to +70 °C
MAB8040HL	microcontroller; 256x8 RAM; 1.0 to 11 MHz; 0 to +70 °C
MAB8048H	microcontroller; 64x8 RAM; 1Kx8 ROM; 1.0 to 11 MHz; 0 to +70 °C
MAB8049H	microcontroller; 128x8 RAM; 2Kx8 ROM; 1.0 to 11 MHz; 0 to +70 °C
MAB8050H	microcontroller; 256x8 RAM; 4Kx8 ROM; 1.0 to 11 MHz; 0 to +70 °C
MAB8051AH–2	microcontroller; 128x8 RAM; 4Kx8 ROM; 3.5 to 12 MHz; 0 to +70 °C
MAB8052AH	microcontroller; 256x8 RAM; 8Kx8 ROM; 3.5 to 12 MHz; 0 to +70 °C
MAB8401	microcontroller; 128x8 RAM; bond–out version for MAB84XX family plus 8–bit LED driver; I^2C bus; 1.0 to 6 MHz; 0 to +70 °C
MAB8411	microcontroller; 64x8 RAM; 1Kx8 ROM plus 8–bit LED driver; I^2C bus; 1.0 to 6 MHz; 0 to +70 °C
MAB8421	microcontroller; 64x8 RAM; 2Kx8 ROM plus 8–bit LED driver; 20 I/O lines; I^2C bus; 1.0 to 6 MHz; 0 to +70 °C
MAB8422	microcontroller; 64x8 RAM; 2Kx8 ROM plus 8–bit LED driver; 15 I/O lines; I^2C bus; 1.0 to 6 MHz; 0 to +70 °C
MAB8441	microcontroller; 128x8 RAM; 4Kx8 ROM plus 8–bit LED driver; 20 I/O lines; I^2C bus; 1.0 to 6 MHz; 0 to +70 °C
MAB8442	microcontroller; 128x8 RAM; 4Kx8 ROM plus 8–bit LED driver; 15 I/O lines; I^2C bus; 1.0 to 6 MHz; 0 to +70 °C
MAB8461	microcontroller; 128x8 RAM; 6Kx8 ROM plus 8–bit LED driver; I^2C bus; 1.0 to 6 MHz; 0 to +70 °C
MAF80A31AH–2	microcontroller; 128x8 RAM; 3.5 to 12 MHz; –40 to +110 °C

NMOS 8–BIT (cont.)

MAF80A32AH	microcontroller; 256x8 RAM; 3.5 to 10 MHz; –40 to +110 °C
MAF80A35HL	microcontroller; 64x8 RAM; 1.0 to 10 MHz; –40 to +110 °C
MAF80A39HL	microcontroller; 128x8 RAM; 1.0 to 10 MHz; –40 to +110 °C
MAF80A40HL	microcontroller; 256x8 RAM; 1.0 to 10 MHz; –40 to +110 °C
MAF80A48H	microcontroller; 64x8 RAM; 1Kx8 ROM; 1.0 to 10 MHz; –40 to +110 °C
MAF80A49H	microcontroller; 128x8 RAM; 2Kx8 ROM; 1.0 to 10 MHz; –40 to +110 °C
MAF80A50H	microcontroller; 256x8 RAM; 4Kx8 ROM; 1.0 to 10 MHz; –40 to +110 °C
MAF80A51AH–2	microcontroller; 128x8 RAM; 4Kx8 ROM; 3.5 to 12 MHz; –40 to +110 °C
MAF80A52AH	microcontroller; 256x8 RAM; 8Kx8 ROM; 3.5 to 10 MHz; –40 to +110 °C
MAF84A11	microcontroller; 64x8 RAM; 1Kx8 ROM; I^2C bus; 1.0 to 5.12 MHz; –40 to +110 °C
MAF84A21	microcontroller; 64x8 RAM; 2Kx8 ROM plus 8–bit LED driver; 20 I/O lines; I^2C bus; 1.0 to 5.12 MHz; –40 to +110 °C
MAF84A22	microcontroller; 64x8 RAM; 2Kx8 ROM plus 8–bit LED driver; 15 I/O lines; I^2C bus; 1.0 to 5.12 MHz; –40 to +110 °C
MAF84A41	microcontroller; 128x8 RAM; 4Kx8 ROM plus 8–bit LED driver; 20 I/O lines; I^2C bus; 1.0 to 5.12 MHz; –40 to +110 °C
MAF84A42	microcontroller; 128x8 RAM; 4Kx8 ROM plus 8–bit LED driver; 15 I/O lines; I^2C bus; 1.0 to 5.12 MHz; –40 to +110 °C
MAF84A61	microcontroller; 128x8 RAM; 6Kx8 ROM plus 8–bit LED driver; I^2C bus; 1.0 to 5.12 MHz; –40 to +110 °C
MAF8031AH–2	microcontroller; 128x8 RAM; 3.5 to 12 MHz; –40 to +85 °C
MAF8032AH	microcontroller; 256x8 RAM; 3.5 to 10 MHz; –40 to +85 °C
MAF8035HL	microcontroller; 64x8 RAM; 1.0 to 11 MHz; –40 to +85 °C
MAF8039HL	microcontroller; 128x8 RAM; 1.0 to 11 MHz; –40 to +85 °C
MAF8040HL	microcontroller; 256x8 RAM; 1.0 to 11 MHz; –40 to +85 °C
MAF8048H	microcontroller; 64x8 RAM; 1Kx8 ROM; 1.0 to 11 MHz; –40 to +85 °C
MAF8049H	microcontroller; 128x8 RAM; 2Kx8 ROM; 1.0 to 11 MHz; –40 to +85 °C
MAF8050H	microcontroller; 256x8 RAM; 4Kx8 ROM; 1.0 to 11 MHz; –40 to +85 °C
MAF8051AH–2	microcontroller; 128x8 RAM; 4Kx8 ROM; 3.5 to 12 MHz; –40 to +85 °C
MAF8052AH	microcontroller; 256x8 RAM; 8Kx8 ROM; 3.5 to 10 MHz; –40 to +85 °C
MAF8411	microcontroller; 64x8 RAM; 1Kx8 ROM plus 8–bit LED driver; I^2C bus; 1.0 to 6 MHz; –40 to +85 °C

NMOS 8–BIT (cont.)

MAF8421	microcontroller; 64x8 RAM; 2Kx8 ROM plus 8–bit LED driver; 20 I/O lines; I^{2}C bus; 1.0 to 6 MHz; –40 to +85 °C
MAF8422	microcontroller; 64x8 RAM; 2Kx8 ROM plus 8–bit LED driver; 15 I/O lines; I^{2}C bus; 1.0 to 6 MHz; –40 to +85 °C
MAF8441	microcontroller; 128x8 RAM; 4Kx8 ROM plus 8–bit LED driver; 20 I/O lines; I^{2}C bus; 1.0 to 6 MHz; –40 to +85 °C
MAF8442	microcontroller; 128x8 RAM; 4Kx8 ROM plus 8–bit LED driver; 15 I/O lines; I^{2}C bus; 1.0 to 6 MHz; –40 to +85 °C
MAF8461	microcontroller; 128x8 RAM; 6Kx8 ROM plus 8–bit LED driver; I^{2}C bus; 1.0 to 6 MHz; –40 to +85 °C

PERIPHERAL ICs

NE587	LED decoder/driver
NE589	LED decoder/driver
NE5018	8–bit microprocessor–compatible DAC
NE5019	8–bit microprocessor–compatible DAC
NE5020	10–bit microprocessor–compatible DAC
NE5118	8–bit microprocessor–compatible DAC with current output
NE5119	8–bit microprocessor–compatible DAC with current output
OM8000	standard Euro–card demo for voice synthesizer MEA8000
OM8200	speech demonstration board (PCF8200)
OM8209	update package for OM8010
OM8210	speech analysis/editing system (PCF8200)
PCF2100	LCD duplex driver; 40 segments
PCF2110	LCD duplex driver; 60 segments and 2 LEDs
PCF2111	LCD duplex driver; 64 segments
PCF2112	LCD driver; 32 segments
PCF2201	LCD flat panel row/column driver
PCF8200	voice synthesizer (CMOS); I^{2}C bus
PCF8566	universal LCD driver for low multiplex rates (1:1 to 1:4); max. 96 elements; I^{2}C bus
PCF8570	256x8–bit static RAM; I^{2}C bus
PCF8571	128x8–bit static RAM; I^{2}C bus
PCF8573	clock calendar; I^{2}C bus
PCF8574	remote 8–bit I/O expander; I^{2}C bus
PCF8574A	remote 8–bit I/O expander; I^{2}C bus; different slave address
PCF8576	universal LCD driver for low multiplex rates 1:1 to 1:4); max. 160 segments; I^{2}C bus
PCF8577	LCD direct driver (32 segments) or duplex driver (64 segments); I^{2}C bus
PCF8577A	LCD direct driver (32 segments) or duplex driver (64 segments); I^{2}C bus; different slave address
PCF8578	LCD row/column driver for dot matrix graphic displays; 40 outputs, of which 24 are programmable; I^{2}C bus
PCF8579	LCD column driver for dot matrix graphic displays; 40 column outputs; I^{2}C bus
PCF8582A	256x8–bit EEPROM; I^{2}C bus

PERIPHERAL ICs (cont.)

PCF8583	clock calendar with 256x8–bit static RAM; I^2C bus
PCF8591	8–bit ADC/DAC; I^2C bus
SAA1099	stereo sound generator for sound effects and music synthesis (µC–controlled)
SAA5350	EUROM, CRT controller (CEPT standard)
SE5018	8–bit microprocessor–compatible DAC
SE5119	8–bit microprocessor–compatible DAC with current output
S8X360	memory address director
TDA1721	8–bit multiplying DAC
TEA2000	PAL/NTSC colour encoder
241 141	high speed FIFO RAM controller

MICROPROCESSORS

SCC68070	microprocessor; 16/32–bit MPU; 68000 CPU; MMU; DMA; timer; UART; I^2C bus
SCN68000	microprocessor; 16/32–bit MPU; 16–bit external/32–bit internal MPU; 17 general purpose 32–bit registers; 16 MB linear address space

PERIPHERAL ICs

NE587	LED decoder/driver
NE589	LED decoder/driver
NE5018	8–bit microprocessor–compatible DAC
NE5019	8–bit microprocessor–compatible DAC
NE5020	10–bit microprocessor–compatible DAC
NE5118	8–bit microprocessor–compatible DAC with current output
NE5119	8–bit microprocessor–compatible DAC with current output
PCB2310	IST bus interface
PCB2390	LTT–4B/3T echo canceller
SAA1045	line driver/detector for digital data bus (D^2B) (built–in filter)
SCB2675	colour/monochrome attributes controller (CMAC)
SCB2675T	turbo colour/monochrome attributes controller (Turbo–CMAC)
SCB2677	video attributes controller (VAC)
SCB68154	interrupt generator (VME bus)
SCB68155	interrupt handler (VME bus)
SCB68171	very little serial interface chip (VLSIC) (VMS–bus–controller to VMS–bus interface)
SCB68172	VME bus controller (BUSCON) interface circuit; master–slave configurations, processor or DMA interface
SCB68175	VME bus master
SCB68430	direct memory access interface (DMAI)
SCC2691	universal asynchronous receiver/transmitter (UART)
SCC2692	dual asynchronous receiver/transmitter (DUART)
SCC2698	octal universal asynchronous receiver/transmitter (Octal UART)
SCC63484	advanced CRT controller (ACRTC)
SCC66470B	video and system controller (VSC); 68000–bus–compatible
SCC68173	VMS bus controller (VMSCON)
SCC68692	dual asynchronous receiver/transmitter (DUART)
SCN2641	asynchronous communications interface (ACI)
SCN2651	programmable communications interface (PCI)
SCN2652	multi–protocol communications controller (MPCC)
SCN2661	enhanced programmable communications interface (EPCI)
SCN2672	programmable video timing controller (PVTC)
SCN2674	advanced video display controller (AVDC)
SCN2681	dual asynchronous receiver/transmitter (DUART)
	dual asynchronous receiver/transmitter (DUART)

PERIPHERAL ICs (cont.)

SCN26562	dual universal serial communications controller (DUSCC); dual channel; asynchronous; multi–protocol operation; DMA interface; two counter/timers; baud rate generator; synchronous bus interface
SCN68562	dual universal serial communications controller (DUSCC); dual channel asynchronous; multi–protocol operation; DMA interface; two timer/counters; baud rate generator; interfaces to the 68000 MPU
SCN68681	dual asynchronous receiver/transmitter (DUART); dual channel; quad buffered receiver; double buffered transmitter; independent baud rate selection; the SCN68681 is for non–multiplexed bus processors like SCN68000; the SCN2681 is for multiplexed bus processors like Intel/Zilog etc.
SE5018	8–bit microprocessor–compatible DAC
SE5119	8–bit microprocessor–compatible DAC with current output
2964B	dynamic memory controller

AMPLIFIERS

NE542	dual low–noise preamplifier
NE5212	transimpedance amplifier
	transimpedance amplifier
SA5212	transimpedance amplifier
SE5212	transimpedance amplifier
μA733	differential video amplifier
μA733C	differential video amplifier

OP AMPS

LM124	quad low power operational amplifier
LM158	dual low power operational amplifier
LM224	quad low power operational amplifier
LM258	dual low power operational amplifier
LM324	quad low power operational amplifier
LM324A	quad low power operational amplifier
LM358	dual low power operational amplifier
LM2902	quad low power operational amplifier
LM2904	dual low power operational amplifier
MC1458	dual general purpose operational amplifier
MC1558	dual general purpose operational amplifier
MC3303	quad low power operational amplifier
MC3403	quad low power operational amplifier
MC3503	quad low power operational amplifier
NE530	high slew rate operational amplifier
NE531	high slew rate operational amplifier
NE532	dual low power operational amplifier
NE538	high slew rate operational amplifier
NE592	video amplifier
NE1012	low noise operational amplifier
NE1037	low noise, high speed precision operational amplifier
NE4558	dual general purpose operational amplifier
NE5204	wide band high frequency amplifier
NE5205	wide band high frequency amplifier
NE5230	low voltage operational amplifier
NE5512	dual high performance operational amplifier
NE5514	quad high performance operational amplifier
NE5517	dual operational transconductance amplifier
NE5517A	dual operational transconductance amplifier
NE5532	internally compensated dual low noise operational amplifier
NE5532A	internally compensated dual low noise operational amplifier
NE5533	dual low noise operational amplifier
NE5533A	dual low noise operational amplifier
NE5534	single low noise operational amplifier
NE5534A	single low noise operational amplifier
NE5535	dual high slew rate operational amplifier
NE5539	ultra high frequency operational amplifier
NE5592	video amplifier
SA532	dual low power operational amplifier
SA534	quad low power operational amplifier
SA741C	general purpose operational amplifier
SA747C	dual operational amplifier
SA1458	dual general purpose operational amplifier
SA4558	dual general purpose operational amplifier
SA5204	wide band high frequency amplifier
SA5205	wide band high frequency amplifier
SA5230	low voltage operational amplifier
SA5512	dual high performance operational amplifier
SA5534	single low noise operational amplifier
SA5534A	single low noise operational amplifier
SE530	high slew rate operational amplifier
SE531	high slew rate operational amplifier
SE532	dual low power operational amplifier
SE538	high slew rate operational amplifier
SE592	video amplifier

OP AMPS (cont.)

SE4558	dual general purpose operational amplifier
SE5205	wide band high frequency amplifier
SE5512	dual high performance operational amplifier
SE5514	quad high performance operational amplifier
SE5532	internally compensated dual low noise operational amplifier
SE5532A	internally compensated dual low noise operational amplifier
SE5534	single low noise operational amplifier
SE5534A	single low noise operational amplifier
SE5535	dual high slew rate operational amplifier
SE5539	ultra high frequency operational amplifier
TCA520B	low–power/low–voltage operational amplifier
TCA520D	low–power/low–voltage operational amplifier
µA741	general purpose operational amplifier
µA741C	general purpose operational amplifier
µA747	dual operational amplifier
µA747C	dual operational amplifier

COMPARATORS

LM111	voltage comparator
LM119	dual voltage comparator
LM139	quad voltage comparator
LM139A	quad voltage comparator
LM193	low power dual voltage comparator
LM193A	low power dual voltage comparator
LM211	voltage comparator
LM219	dual voltage comparator
LM239	quad voltage comparator
LM239A	quad voltage comparator
LM293	low power dual voltage comparator
LM293A	low power dual voltage comparator
LM311	voltage comparator
LM319	dual voltage comparator
LM339	quad voltage comparator
LM339A	quad voltage comparator
LM393	low power dual voltage comparator
LM393A	low power dual voltage comparator
LM2901	quad voltage comparator
LM2903	low power dual voltage comparator
MC3302	quad voltage comparator
NE521	high speed dual differential comparator/ sense amplifier
NE522	high speed dual differential comparator/ sense amplifier
NE527	voltage comparator
NE529	voltage comparator
NE5105	precision high–speed comparator with latch
NE5105A	precision high–speed comparator with latch
SA5105	precision high–speed comparator with latch
SA5105A	precision high–speed comparator with latch
SE521	high speed dual differential comparator/ sense amplifier
SE522	high–speed dual differential comparator/sense amplifier
SE527	voltage comparator
SE529	voltage comparator
SE5105	precision high–speed comparator with latch
SE5105A	precision high–speed comparator with latch

GENERAL PURPOSE

DATA CONVERSION

ADCs, DACs

ADC0801–1	8–bit CMOS ADC
ADC0802–1	8–bit CMOS ADC
ADC0803–1	8–bit CMOS ADC
ADC0804–1	8–bit ADC (CMOS)
ADC0805–1	8–bit ADC (CMOS)
ADC0820	8–bit CMOS ADC with track/hold
AM6012	12–bit multiplying DAC
DAC08	8–bit high–speed multiplying DAC
MC1408–7	8–bit multiplying DAC
MC1408–8	8–bit multiplying DAC
MC1508–8	8–bit multiplying DAC
MC3410	10–bit high speed multiplying DAC
MC3410C	10–bit high speed multiplying DAC
MC3510	10–bit high–speed multiplying DAC
NE5018	8–bit microprocessor–compatible DAC
NE5019	8–bit microprocessor–compatible DAC
NE5020	10–bit microprocessor–compatible DAC
NE5030	10–bit high–speed microprocessor–compatible DAC
NE5034	8–bit high–speed ADC
NE5036	6–bit ADC (serial output)
NE5037	6–bit ADC (parallel outputs)
NE5118	8–bit microprocessor–compatible DAC with current output
NE5119	8–bit microprocessor–compatible DAC with current output
NE5150	RGB video DAC
NE5151	RGB video DAC
NE5152	RGB video DAC
NE5410	10–bit high speed multiplying DAC
PCF8591	8–bit ADC/DAC; I^2C bus
SE5018	8–bit microprocessor–compatible DAC
SE5019	8–bit microprocessor–compatible DAC
SE5030	10–bit high–speed microprocessor–compatible DAC
SE5118	8–bit microprocessor–compatible DAC with current output
SE5119	8–bit microprocessor–compatible DAC with current output
SE5410	10–bit high–speed multiplying DAC
TDA1432	8–bit DAC (CMOS)
TDA1534	14–bit ADC
TDA1541A	dual 16–bit DAC
TDA1543	dual 16–bit economy DAC (I^2S bus format)
TDA1543A	dual 16–bit economy DAC (Japanese format)
TDA8702	8–bit high–performance, high–speed video DAC; 30 MHz (max.); TTL–compatible
TDA8703	8–bit high–performance, high–speed ADC; 40 MHz (max.); TTL–compatible

DRIVERS

MC1488	quad line driver
NE587	LED decoder/driver
NE589	LED decoder/driver
NE590	addressable peripheral drivers
NE591	addressable peripheral drivers
NE594	vacuum fluorescent display driver
NE5090	addressable relay driver
NE5170	octal line driver
SAA1064	4–digit LED driver; I^{2}C bus
SA594	vacuum fluorescent display driver
TEA1017	13–bit series–parallel converter and display driver
ULN2003	high–voltage/high current Darlington transistor array
ULN2004	high voltage/high current Darlington transistor array

RECEIVERS

MC1489	quad line receiver
MC1489A	quad line receiver
NE5180	octal differential line receiver
NE5181	octal differential line receiver

INTERFACES

MEB3000	PDV–bus interface circuit
NE587	LED decoder/driver
NE589	LED decoder/driver
NE590	addressable peripheral drivers
NE591	addressable peripheral drivers
NE5090	addressable relay driver
PCF8574	remote 8–bit I/O expander; I^2C bus
PCF8574A	remote 8–bit I/O expander; I^2C bus; different slave address
SAA1029	universal industrial logic and interface circuit
TEA1017	13–bit series–parallel converter and display driver
ULN2003	high–voltage/high current Darlington transistor array
ULN2004	high voltage/high current Darlington transistor array

MOTOR CONTROL

NE544	servo amplifier
NE5044	programmable seven–channel RC encoder
NE5045	seven channel RC decoder
NE5570	brushless DC motor controller
SAA1027	stepping motor control circuit
SA5570	brushless DC motor controller
SE5570	brushless DC motor controller
TDA5040	DC motor drive circuit with magnetic–field detector
TDA5045	DC motor drive circuit with magnetic–field detector
TDA5140	DC scanner motor driver
TEA1012	stepping motor control circuit

POSITION MEASUREMENT

NE5520	linear variable differential transformer (LVDT) signal conditioner
NE5521	linear variable differential transformer (LVDT) signal conditioner
SA5521	linear variable differential transformer (LVDT) signal conditioner
SE5521	linear variable differential transformer (LVDT) signal conditioner

POWER SUPPLY ICs

NE5560	SMPS controller
NE5561	SMPS controller
NE5562	SMPS controller
NE5568	SMPS controller
SA723C	precision voltage regulator
SE5560	SMPS controller
SE5561	SMPS controller
SE5562	SMPS controller
SG1524C	SMPS controller
SG1526	SMPS controller
SG2524C	SMPS controller
SG2526	SMPS controller
SG3524	SMPS controller
SG3524C	SMPS controller
SG3526	SMPS controller
TDA1023	proportional–control triac triggering circuit
TDA1060	SMPS controller
TDA1060A	SMPS controller
TDA1060B	SMPS controller
TDA1060T	SMPS controller
TDA3645	SMPS driver
μA723	precision voltage regulator
μA723C	precision voltage regulator

SAMPLE–AND–HOLD

LF198	sample–and–hold amplifier
LF298	sample–and–hold amplifier
LF398	sample–and–hold amplifier
NE5060	precision high–speed sample–and–hold amplifier
NE5537	low leakage sample–and–hold amplifier
SE5060	precision high–speed sample–and–hold amplifier
SE5537	low leakage sample–and–hold amplifier
TDA1535	high–speed sample–and–hold amplifier

TIMERS

ICM7555	general purpose CMOS timer
NE555	timer
NE556	dual timer
NE556–1	dual timer
NE558	quad timer
SA555	timer
SA556	dual timer
SA556–1	dual timer
SA558	quad timer
SE555	timer
SE555C	timer
SE556	dual timer
SE556–1	dual timer
SE556–1C	dual timer
SE556C	dual timer
SE558	quad timer

ANALOG CLOCKS

PCA1512	4 MHz DC alarm clock circuit; bipolar motor; output cycle time = 1 s; pulse duration = 1 s
PCA1517	4 MHz DC alarm clock circuit; bipolar motor; output cycle time = 1 s; pulse duration = 46.8 ms
PCA1584	32 kHz alarm clock circuit; EEPROM; bipolar motor; output cycle time = 1 s; pulse duration = 46.8 ms
PCA1585	32 kHz alarm clock circuit; EEPROM; bipolar motor; output cycle time = 1 s; pulse duration = 46.8 ms
PCA1586	32 kHz alarm clock circuit; EEPROM; bipolar motor; output cycle time = 1 s; pulse duration = 15.6 ms
PCA1587	32 kHz alarm clock circuit; EEPROM; bipolar motor; output cycle time = 4 s; pulse duration = 15.6 ms
PCA1590	32 kHz alarm clock circuit with EEPROM for frequency adjustment

ANALOG WATCHES

PCA1201	32 kHz watch circuit; bipolar motor; output cycle time = 1 s; pulse duration = 7.8 ms
PCA1203	32 kHz watch circuit; bipolar motor; output cycle time = 20 s; pulse duration = 7.8 ms
PCA1204	32 kHz watch circuit; bipolar motor; output cycle time = 5 s; pulse duration = 7.8 ms
PCA1205	32 kHz watch circuit; bipolar motor; output cycle time = 12 s; pulse duration = 6.8 ms
PCA1207	32 kHz watch circuit; bipolar motor; output cycle time = 10 s; pulse duration = 7.8 ms
PCA1209	32 kHz watch circuit; bipolar motor; output cycle time = 1 s; pulse duration = 5.9 ms
PCA1212	32 kHz watch circuit; bipolar motor; output cycle time = 1 s; pulse duration = 7.8 ms
PCA1243	32 kHz watch circuit; bipolar motor; output cycle time = 20 s; pulse duration = 6.8 ms
PCA1246	32 kHz watch circuit; bipolar motor; output cycle time = 1 s; pulse duration = 3.9 ms
PCA1247	32 kHz watch circuit; bipolar motor; output cycle time = 1 s; pulse duration = 6.8 ms
PCA1248	32 kHz watch circuit; bipolar motor; output cycle time = 10 s; pulse duration = 5.9 ms
PCA1249	32 kHz watch circuit; bipolar motor; output cycle time = 12 s; pulse duration = 5.9 ms
PCA1260	32 kHz watch circuit; bipolar motor; output cycle time = 1 s; pulse duration = 7.8 ms; end of life detector
PCA1261	32 kHz watch circuit; bipolar motor; output cycle time = 1 s; pulse duration = 7.8 ms
PCA1401	32 kHz watch circuit; EEPROM; bipolar motor; output cycle time = 1 s; pulse duration = 7.8 ms
PCA1403	32 kHz watch circuit; EEPROM; bipolar motor; output cycle time = 20 s; pulse duration = 7.8 ms
PCA1404	32 kHz watch circuit; EEPROM; bipolar motor; output cycle time = 5 s; pulse duration = 7.8 ms
PCA1408	32 kHz watch circuit; EEPROM; bipolar motor; output cycle time = 20 s; pulse duration = 5.8 ms
PCA1409	32 kHz watch circuit; EEPROM; bipolar motor; output cycle time = 1 s; pulse duration = 5.8 ms

ANALOG WATCHES (cont.)

PCA1411	32 kHz watch circuit; bipolar motor; output cycle time = 1 s; pulse duration = 7.8 ms
PCA1412	32 kHz watch circuit; EEPROM; bipolar motor; output cycle time = 1 s; pulse duration = 31.2 ms
PCA1426	32 kHz watch circuit; EEPROM; bipolar motor; output cycle time = 20 s; pulse duration = 5.8 ms
PCA1446	32 kHz watch circuit; EEPROM; bipolar motor; output cycle time = 1 s; pulse duration = 3.9 ms
PCA1449	32 kHz watch circuit; EEPROM; bipolar motor; output cycle time = 12 s; pulse duration = 5.8 ms
PCA1460	32 kHz watch circuit; bipolar motor; output cycle time = 1 s; pulse duration = 7.8 ms; battery voltage and end of life detector
PCA1461	32 kHz watch circuit; bipolar motor; output cycle time = 1 s; pulse duration = 7.8 ms; battery voltage level detector
PCA1462	32 kHz watch circuit; bipolar motor; output cycle time = 1 s; pulse duration = 5.8 ms; battery voltage and end of life detector
PCA1463	32 kHz watch circuit; bipolar motor; output cycle time = 1 s; pulse duration = 3.9 ms; battery voltage and end of life detector

DIGITAL CLOCKS

NE587	LED decoder/driver
NE589	LED decoder/driver
NE594	vacuum fluorescent display driver
PCF1171	4–digit LCD car clock circuit
PCF1172	3.5–digit LCD car clock circuit
PCF1174	4–digit static–LCD car clock circuit; EEPROM
PCF1175	4–digit duplex–LCD car clock circuit; EEPROM
PCF1176	4–digit static–LCD car clock circuit; EEPROM
PCF1178	4–digit duplex–LCD driver; I^{2}C bus
SAA1064	4–digit LED driver; I^{2}C bus
SA594	vacuum fluorescent display driver

DATA COMMUNICATIONS

AM26LS31	quad high–speed differential line driver
MC1488	quad line driver
MC1489	quad line receiver
MC1489A	quad line receiver
NE564	phase–locked loop; 5 V supply; up to 50 MHz; TTL compatible in/out
NE568	phase–locked loop; up to 150 MHz
NE592	video amplifier
NE602	double–balanced mixer and oscillator
NE604	low power narrow band FM IF system
NE5050	power line modem
NE5080	high–speed FSK modem transmitter
NE5081	high–speed FSK modem receiver
NE5170	octal line driver
NE5180	octal differential line receiver
NE5181	octal differential line receiver
NE5204	wide band high frequency amplifier
NE5205	wide band high frequency amplifier
NE5212	transimpedance amplifier
NE5539	ultra high frequency operational amplifier
N8X01A	CRC generator/checker
N8X60	FIFO RAM controller (4K RAM)
N74F86	quad 2–input EXCLUSIVE–OR gate
N74F764	DRAM dual–ported controller
N74F764–1	DRAM dual–ported controller
N74F764A	DRAM dual ported controller
N74F765	DRAM dual–ported controller without latch
N74F765–1	DRAM dual–ported controller without latch
N74F765A	DRAM dual–ported controller without latch
N74F1763	1 M–bit intelligent DRAM controller
N74F1764	1 M–bit DRAM dual–ported controller with latch
N74F1764–1	1 M–bit DRAM dual–ported controller with latch
N74F1765	1 M–bit DRAM dual–ported controller without latch
N74F1765–1	1 M–bit DRAM dual–ported controller without latch
N74LS429	FIFO RAM controller (64K)
PCB2310	IST bus interface
PCB2320	data rate adapter
PCB2390	LTT–4B/3T echo canceller
PC74HCT4046A	phase–locked loop with VCO
PC74HCT7030	9–bit x 64 word FIFO register; 3–state
PC74HCT40105	4–bit x 16 word FIFO register
PC74HC4046A	phase–locked loop with VCO
PC74HC7030	9–bit x 64 word FIFO register; 3–state
PC74HC40105	4–bit x 16 word FIFO register
SAA1045	line driver/detector for digital data bus (D^2B) (built–in filter)
SAA1235	universal digital data bus (D^2B) transceiver
SA602	double–balanced mixer and oscillator
SA604	low power narrow band FM IF system
SA5204	wide band high frequency amplifier
SA5205	wide band high frequency amplifier
SA5212	transimpedance amplifier
SCC2691	universal asynchronous receiver/transmitter (UART)
SCC2692	dual asynchronous receiver/transmitter (DUART)
SCC2698	octal universal asynchronous receiver/transmitter (Octal UART)
SCC68692	dual asynchronous receiver/transmitter (DUART)
SCN2641	asynchronous communications interface (ACI)
SCN2652	multi–protocol communications controller (MPCC)

DATA COMMUNICATIONS (cont.)

SCN2661	enhanced programmable communications interface (EPCI)
SCN2681	dual asynchronous receiver/transmitter (DUART)
SCN68562	dual universal serial communications controller (DUSCC); dual channel asynchronous; multi–protocol operation; DMA interface; two timer/counters; baud rate generator; interfaces to the 68000 MPU
SCN68681	dual asynchronous receiver/transmitter (DUART); dual channel; quad buffered receiver; double buffered transmitter; independent baud rate selection; the SCN68681 is for non–multiplexed bus processors like SCN68000; the SCN2681 is for multiplexed bus processors like Intel/Zilog etc.
SE564	phase–locked loop; 5 V supply; up to 50 MHz; TTL compatible in/out
SE592	video amplifier
SE5205	wide band high frequency amplifier
SE5212	transimpedance amplifier
SE5539	ultra high frequency operational amplifier
TEA5500	coded locking circuit for security systems
9401	CRC generator/checker

RADIO COMMUNICATIONS

CA3089	FM IF system
MC1496	balanced modulator/demodulator
MC1596	balanced modulator/demodulator
MC3361	low power FM IF system
NE564	phase–locked loop; 5 V supply; up to 50 MHz; TTL compatible in/out
NE565	phase locked loop; ±6 to ±12 V supply; 0.001 Hz to 500 kHz; TTL/DTL compatible output
NE566	function generator
NE567	tone/frequency decoder PLL
NE568	phase–locked loop; up to 150 MHz
NE570	compandor
NE571	compandor
NE572	programmable analog compandor
NE575	low voltage dual expander/single compandor or automatic level controller
NE602	double–balanced mixer and oscillator
NE604	low power narrow band FM IF system
NE605	low–power FM IF system
NE612	double balanced mixer and oscillator
NE614	low power FM IF system
SA571	compandor
SA572	programmable analog compandor
SA575	low voltage dual expander/single compandor or automatic level controller
SA602	double–balanced mixer and oscillator
SA604	low power narrow band FM IF system
SA605	low–power FM IF system
SCC66470B	video and system controller (VSC); 68000–bus–compatible
SE564	phase–locked loop; 5 V supply; up to 50 MHz; TTL compatible in/out
SE565	phase–locked loop; ± 6 to ± 12 V supply; TTL/DTL compatible output
SE566	function generator
SE567	tone/frequency decoder PLL
TDB1080	IF limiting amplifier, FM detector and audio amplifier
UMA1000	data processor for cellular radio (DPROC); I^{2}C bus
UMA1010	low–power universal frequency synthesizer for radio communications; 400 to 1150 MHz; I^{2}C bus

AMPLIFIERS

NE542	dual low–noise preamplifier
OM200/S2	integrated amplifier for use in hearing aids
TAA263	low level amplifier
TAA320	integrated MOST amplifier
TDA1002A	recording amplifier with preamplifier and automatic level control
TDA1010A	6 W audio power amplifier for in–car applications/10 W audio power amplifier for mains–fed applications
TDA1011	2 to 6 W audio power amplifier with preamplifier
TDA1013B	4 W audio power amplifier with DC volume control
TDA1015	1 to 4 W audio power amplifier with preamplifier
TDA1015T	0.5 W audio power amplifier with preamplifier
TDA1016	2 W recording/playback audio power amplifier with preamplifier, automatic level control, short circuit and thermal protection
TDA1020	12 W audio power amplifier with preamplifier for car radios
TDA1510A	24 W BTL or 2x12 W stereo car radio power amplifier
TDA1512A	12 to 20 W hi–fi audio power amplifier
TDA1514	40 W hi–fi power amplifier for digital audio (e.g. Compact Disc)
TDA1514A	40 W hi–fi power amplifier for digital audio (e.g. Compact Disc)
TDA1515B	24 W BTL or 2x12 W stereo car radio power amplifier
TDA1516Q	22 W BTL or 2x11 W stereo car radio power amplifier; closed loop voltage gain 26 dB
TDA1517	2x6 W stereo car radio audio power amplifier (20 dB gain)
TDA1518Q	22 W BTL or 2x11 W stereo car radio power amplifier; closed loop voltage gain 46 dB
TDA1519	2x6 W stereo car radio audio power amplifier (40 dB gain)
TDA1519A	22 W BTL or 2x11 W stereo car radio power amplifier
TDA1519B	12 W BTL or 2x6 W stereo car radio power amplifier
TDA1520B	20 W hi–fi audio power amplifier; complete SOAR protection
TDA1521	2x12 W hi–fi stereo audio power amplifier
TDA1521A	2x6 W hi–fi stereo audio power amplifier
TDA1521Q	2x12 W hi–fi stereo audio power amplifier
TDA1522	stereo playback amplifier/equalizer with mute switch
TDA1535	high–speed sample–and–hold amplifier
TDA2611A	5 W audio power amplifier
TDA2613	6 W hi–fi audio power amplifier
TDA7050	150 mW BTL or 2x75 mW stereo audio power amplifier; low voltage
TDA7052	1 W BTL mono audio amplifier for portable applications
TDA7053	2x1 W BTL stereo audio power amplifier for portable applications

ARI SYSTEM

TDA1579	traffic warning decoder circuit (AM carriers); ARI system
TDA1589	traffic control message and warning tone circuit; ARI system

AUDIO ICs

Bus–controlled

PCF5022	CMOS analogue interface circuit (digital section) for audio systems; I^{2}S bus
PCF5023	CMOS analogue interface circuit (digital section) for audio systems; I^{2}S bus
TDA8420	hi–fi stereo audio processor; I^{2}C bus
TDA8421	hi–fi stereo audio processor; I^{2}C bus
TDA8425	hi–fi stereo audio processor; I^{2}C bus
TEA6300	car radio preamplifier and source selector with sound and fader controls; I^{2}C bus
TEA6310	sound fader control circuit; I^{2}C bus

DC–controlled

TDA1029	signal–sources switch (4 x two channels)
TDA1074A	dual tandem electronic potentiometer circuit
TDA1524A	stereo tone/volume control circuit
TDA1525	stereo tone/volume control circuit
TDA1600	multi–function oscillator switch for audio cassette recorders
TDA3810	spatial, stereo and pseudo–stereo sound circuit
TDD1601	equalizer for audio cassette recorders

CLOCK/CALENDAR

PCF8573	clock calendar; I^{2}C bus
PCF8583	clock calendar with 256x8–bit static RAM; I^{2}C bus

DATA CONVERSION

ADCs, DACs

MC3510	10–bit high–speed multiplying DAC
PCF8591	8–bit ADC/DAC; I^{2}C bus
PNA7509	7–bit ADC; 22 MHz; 3–state output
PNA7518	8–bit multiplying DAC; 30 MHz
SAA7320	stereo DAC for Compact Disc
SE5410	10–bit high–speed multiplying DAC
TDA1534	14–bit ADC
TDA1541A	dual 16–bit DAC
TDA1543	dual 16–bit economy DAC (I^{2}S bus format)
TDA1543A	dual 16–bit economy DAC (Japanese format)
TDA8444	octuple 6–bit DAC; I^{2}C bus

DIGITAL AUDIO

Compact Disc

SAA7210	decoder for Compact Disc (second generation)
SAA7220	digital filter and interpolator for Compact Disc (second generation)
SAA7310	decoder for Compact Disc (third generation)
SAA7320	stereo DAC for Compact Disc
SAA7340	decoder/digital filter/DAC for Compact Disc
SAA7610	digital signal controller/decoder/character generator for CD–V (PAL)
SAA7611	digital signal controller/decoder/character generator for CD–V (PAL, NTSC)
SAA7630	CCD delay line for error correction in video and sound carrier timebases (laservision players)
TDA1514	40 W hi–fi power amplifier for digital audio (e.g. Compact Disc)
TDA1514A	40 W hi–fi power amplifier for digital audio (e.g. Compact Disc)
TDA1541A	dual 16–bit DAC
TDA1542	active element for post filtering (dual channel)
TDA1543	dual 16–bit economy DAC (I^2S bus format)
TDA1543A	dual 16–bit economy DAC (Japanese format)
TDA5708	photo diode signal processor for Compact Disc single–spot read–out systems
TDA5709	radial error signal processor for Compact Disc
TDA8808	photo diode signal processor for Compact Disc
TDA8808A	photo diode signal processor for Compact Disc
TDA8809	radial error signal processor for Compact Disc

Input circuits

SAA7274	audio digital input circuit (ADIC)
TDA1542	active element for post filtering (dual channel)

DISPLAY DRIVERS

PCF1303	18–element bar graph LCD driver (with analogue input)
PCF2100	LCD duplex driver; 40 segments
PCF2110	LCD duplex driver; 60 segments and 2 LEDs
PCF2111	LCD duplex driver; 64 segments
PCF2112	LCD driver; 32 segments
PCF2201	LCD flat panel row/column driver
PCF8566	universal LCD driver for low multiplex rates (1:1 to 1:4); max. 96 elements; I^2C bus
PCF8576	universal LCD driver for low multiplex rates 1:1 to 1:4); max. 160 segments; I^2C bus
PCF8577	LCD direct driver (32 segments) or duplex driver (64 segments); I^2C bus
PCF8577A	LCD direct driver (32 segments) or duplex driver (64 segments); I^2C bus; different slave address
PCF8578	LCD row/column driver for dot matrix graphic displays; 40 outputs, of which 24 are programmable; I^2C bus
PCF8579	LCD column driver for dot matrix graphic displays; 40 column outputs; I^2C bus

DISPLAY DRIVERS (cont.)

SAA1060	LED display/interface circuit
SAA1064	4–digit LED driver; I^2C bus

DOLBY ICs

NE645	Dolby B and C type noise reduction circuit
NE646	Dolby B and C type noise reduction circuit
NE648	low voltage Dolby B type noise reduction circuit
NE649	low voltage Dolby B type noise reduction circuit
NE650	Dolby B type noise reduction circuit
NE5240	Dolby digital audio decoder
TEA0652	Dolby B & C noise reduction circuit
TEA0653	stereo or 2–channel Dolby B noise reduction circuit
TEA0654	preamplifier and electronic switch for Dolby B & C noise reduction circuits
TEA0657	dual Dolby B noise reduction circuit
TEA0665	Dolby B & C processor with preamplifier and electronic switch
TEA0666	Dolby B & C processor with preamplifier and electronic switch; changed frequency response in relation to TEA0665
TEA0670	Dolby B & C processor with preamplifier and electronic switch; low voltage

FREQUENCY SYNTHESIZERS

HEF4750V	frequency synthesizer
SAA1057	radio tuning PLL frequency synthesizer (SYMO II)
TDD1742	low power frequency synthesizer (LOPSY)
TSA6057	radio tuning PLL frequency synthesizer; I^2C bus

I^2C BUS ICs

MAB8401	microcontroller; 128x8 RAM; bond–out version for MAB84XX family plus 8–bit LED driver; I^2C bus; 1.0 to 6 MHz; 0 to +70 °C
MAB8411	microcontroller; 64x8 RAM; 1Kx8 ROM plus 8–bit LED driver; I^2C bus; 1.0 to 6 MHz; 0 to +70 °C
MAB8421	microcontroller; 64x8 RAM; 2Kx8 ROM plus 8–bit LED driver; 20 I/O lines; I^2C bus; 1.0 to 6 MHz; 0 to +70 °C
MAB8422	microcontroller; 64x8 RAM; 2Kx8 ROM plus 8–bit LED driver; 15 I/O lines; I^2C bus; 1.0 to 6 MHz; 0 to +70 °C
MAB8441	microcontroller; 128x8 RAM; 4Kx8 ROM plus 8–bit LED driver; 20 I/O lines; I^2C bus; 1.0 to 6 MHz; 0 to +70 °C
MAB8442	microcontroller; 128x8 RAM; 4Kx8 ROM plus 8–bit LED driver; 15 I/O lines; I^2C bus; 1.0 to 6 MHz; 0 to +70 °C
MAB8461	microcontroller; 128x8 RAM; 6Kx8 ROM plus 8–bit LED driver; I^2C bus; 1.0 to 6 MHz; 0 to +70 °C
MAF84A11	microcontroller; 64x8 RAM; 1Kx8 ROM; I^2C bus; 1.0 to 5.12 MHz; –40 to +110 °C

I²C BUS ICs (cont.)

MAF84A21	microcontroller; 64x8 RAM; 2Kx8 ROM plus 8–bit LED driver; 20 I/O lines; I²C bus; 1.0 to 5.12 MHz; –40 to +110 °C
MAF84A22	microcontroller; 64x8 RAM; 2Kx8 ROM plus 8–bit LED driver; 15 I/O lines; I²C bus; 1.0 to 5.12 MHz; –40 to +110 °C
MAF84A41	microcontroller; 128x8 RAM; 4Kx8 ROM plus 8–bit LED driver; 20 I/O lines; I²C bus; 1.0 to 5.12 MHz; –40 to +110 °C
MAF84A42	microcontroller; 128x8 RAM; 4Kx8 ROM plus 8–bit LED driver; 15 I/O lines; I²C bus; 1.0 to 5.12 MHz; –40 to +110 °C
MAF84A61	microcontroller; 128x8 RAM; 6Kx8 ROM plus 8–bit LED driver; I²C bus; 1.0 to 5.12 MHz; –40 to +110 °C
MAF8411	microcontroller; 64x8 RAM; 1Kx8 ROM plus 8–bit LED driver; I²C bus; 1.0 to 6 MHz; –40 to +85 °C
MAF8421	microcontroller; 64x8 RAM; 2Kx8 ROM plus 8–bit LED driver; 20 I/O lines; I²C bus; 1.0 to 6 MHz; –40 to +85 °C
MAF8422	microcontroller; 64x8 RAM; 2Kx8 ROM plus 8–bit LED driver; 15 I/O lines; I²C bus; 1.0 to 6 MHz; –40 to +85 °C
MAF8441	microcontroller; 128x8 RAM; 4Kx8 ROM plus 8–bit LED driver; 20 I/O lines; I²C bus; 1.0 to 6 MHz; –40 to +85 °C
MAF8442	microcontroller; 128x8 RAM; 4Kx8 ROM plus 8–bit LED driver; 15 I/O lines; I²C bus; 1.0 to 6 MHz; –40 to +85 °C
MAF8461	microcontroller; 128x8 RAM; 6Kx8 ROM plus 8–bit LED driver; I²C bus; 1.0 to 6 MHz; –40 to +85 °C
PCA80C552	microcontroller; 256x8 RAM; 16–bit capture/compare timer/counter; watch–dog timer; 2 pulse–width modulated signals; 8–bit input to 10–bit ADC; I²C bus; 1.2 to 12 MHz; –40 to +110 °C
PCA80C652	microcontroller; 256x8 RAM; serial I/O; UART; I²C bus; 1.2 to 12 MHz; –40 to +110 °C
PCA83C552	microcontroller; 256x8 RAM; 8Kx8 ROM; 16–bit capture/compare timer/counter; watch–dog timer; 2 pulse–width modulated signals; 8–bit input to 10–bit ADC; I²C bus; 1.2 to 12 MHz; –40 to +110 °C
PCA83C652	microcontroller; 256x8 RAM; 8Kx8 ROM; serial I/O; UART; I²C bus; 1.2 to 12 MHz; –40 to +110 °C
PCA83C654	microcontroller; 256x8 RAM; 16Kx8 ROM; serial I/O; UART; I²C bus; 1.2 to 12 MHz; –40 to +110 °C
PCB80C552	microcontroller; 256x8 RAM; 16–bit capture/compare timer/counter; watch–dog timer; two pulse–width modulated signals; 8–bit input to 10–bit ADC; I²C bus; 1.2 to 12 MHz; 0 to +70 °C
PCB80C652	microcontroller; 256x8 RAM; serial I/O; UART; I²C bus; 1.2 to 12 MHz; 0 to +70 °C
PCB83C552	microcontroller; 256x8 RAM; 8Kx8 ROM; 16–bit capture/compare timer/counter; watch–dog timer; two pulse–width modulated signals; 8–bit to 10–bit ADC; I²C bus; 1.2 to 12 MHZ; 0 to +70 °C

I^2C BUS ICs (cont.)

PCB83C652	microcontroller; 256x8 RAM; 8Kx8 ROM; serial I/O; UART; I^2C bus; 1.2 to 12 MHz; 0 to +70 °C
PCB83C654	microcontroller; 256x8 RAM; 16Kx8 ROM; serial I/O; UART; I^2C bus; 1.2 to 12 MHz; 0 to +70 °C
PCF80C552	microcontroller; 256x8 RAM; 16–bit capture/compare timer/counter; watch–dog timer; 2 pulse–width modulated signals; 8–bit input to 10–bit ADC; I^2C bus; 1.2 to 12 MHz; –40 to +85 °C
PCF80C652	microcontroller; 256x8 RAM; serial I/O; UART: I^2C bus; 1.2 to 12 MHz; –40 to +85 °C
PCF83C552	microcontroller; 256x8 RAM; 8Kx8 ROM; 16–bit capture/compare timer/counter; watch–dog timer; 2 pulse–width modulated signals; 8–bit input to 10–bit ADC; I^2C bus; 1.2 to 12 MHz; –40 to +85 °C
PCF83C652	microcontroller; 256x8 RAM; 8Kx8 ROM; serial I/O; UART; I^2C bus; 1.2 to 12 MHz; –40 to +85 °C
PCF83C654	microcontroller; 256x8 RAM; 16Kx8 ROM; serial I/O; UART; I^2C bus; 1.2 to 12 MHz; –40 to +85 °C
PCF8200	voice synthesizer (CMOS); I^2C bus
PCF8566	universal LCD driver for low multiplex rates (1:1 to 1:4); max. 96 elements; I^2C bus
PCF8570	256x8–bit static RAM; I^2C bus
PCF8571	128x8–bit static RAM; I^2C bus
PCF8573	clock calendar; I^2C bus
PCF8574	remote 8–bit I/O expander; I^2C bus
PCF8574A	remote 8–bit I/O expander; I^2C bus; different slave address
PCF8576	universal LCD driver for low multiplex rates 1:1 to 1:4); max. 160 segments; I^2C bus
PCF8577	LCD direct driver (32 segments) or duplex driver (64 segments); I^2C bus
PCF8577A	LCD direct driver (32 segments) or duplex driver (64 segments); I^2C bus; different slave address
PCF8578	LCD row/column driver for dot matrix graphic displays; 40 outputs, of which 24 are programmable; I^2C bus
PCF8579	LCD column driver for dot matrix graphic displays; 40 column outputs; I^2C bus
PCF8582A	256x8–bit EEPROM; I^2C bus
PCF8583	clock calendar with 256x8–bit static RAM; I^2C bus
PCF8591	8–bit ADC/DAC; I^2C bus
SAA1064	4–digit LED driver; I^2C bus
SAA1300	tuner switching circuit; I^2C bus
SAA3028	high performance transcoder (RC–5) for infrared remote control; I^2C bus
TDA8420	hi–fi stereo audio processor; I^2C bus
TDA8421	hi–fi stereo audio processor; I^2C bus
TDA8425	hi–fi stereo audio processor; I^2C bus
TEA6000	FM/IF system and microcomputer–based tuning interface; I^2C bus
TEA6100	FM/IF system and microcomputer–based tuning interface; I^2C bus
TEA6300	car radio preamplifier and source selector with sound and fader controls; I^2C bus
TEA6310	sound fader control circuit; I^2C bus

INTERFERENCE SUPPRESSORS

TDA1001B	interference and noise suppression circuit for FM receivers

LEVEL SENSOR (MOST)

TAA320A	integrated MOST level sensor

MEMORIES

FCB61C65–45	8192x8–bit high–speed CMOS static RAM; access time 45 ns
FCB61C65–55	8192x8–bit high–speed CMOS static RAM; access time 55 ns
FCB61C65–70	8192x8–bit high–speed CMOS static RAM; access time 70 ns
FCB61C65L–45	8192x8–bit high–speed CMOS low–power static RAM; access time 45 ns
FCB61C65L–55	8192x8–bit high–speed CMOS low–power static RAM; access time 55 ns
FCB61C65L–70	8192x8–bit high–speed CMOS low–power static RAM; access time 70 ns
PCF8570	256x8–bit static RAM; I^2C bus
PCF8571	128x8–bit static RAM; I^2C bus
PCF8582A	256x8–bit EEPROM; I^2C bus

MICROCONTROLLERS

CMOS 8–bit

PCA80C31BH–3	microcontroller; 128x8 RAM; 1.2 to 12 MHz; –40 to +110 °C
PCA80C39	microcontroller; 128x8 RAM; 1.0 to 15 MHz; –40 to +110 °C
PCA80C49	microcontroller; 128x8 RAM; 2Kx8 ROM; 1.0 to 15 MHz; –40 to +110 °C
PCA80C51BH–3	microcontroller; 128x8 RAM; 4Kx8 ROM; 1.2 to 12 MHz; –40 to +110 °C
PCA80C552	microcontroller; 256x8 RAM; 16–bit capture/compare timer/counter; watch–dog timer; two pulse–width modulated signals; 8–bit input to 10–bit ADC; I^2C bus; 1.2 to 12 MHz; –40 to +110 °C
PCA80C652	microcontroller; 256x8 RAM; serial I/O; UART; I^2C bus; 1.2 to 12 MHz; –40 to +110 °C
PCA83C552	microcontroller; 256x8 RAM; 8Kx8 ROM; 16–bit capture/compare timer/counter; watch–dog timer; two pulse–width modulated signals; 8–bit to 10–bit ADC; I^2C bus; 1.2 to 12 MHZ; –40 to +110 °C
PCA83C652	microcontroller; 256x8 RAM; 8Kx8 ROM; serial I/O; UART; I^2C bus; 1.2 to 12 MHz; –40 to +110 °C
PCA83C654	microcontroller; 256x8 RAM; 16Kx8 ROM; serial I/O; UART; I^2C bus; 1.2 to 12 MHz; –40 to +110 °C
PCB80C31BH–3	microcontroller; 128x8 RAM; 1.2 to 16 MHz; 0 to +70 °C
PCB80C39	microcontroller; 128x8 RAM; 1.0 to 15 MHz; 0 to +70 °C
PCB80C49	microcontroller; 128x8 RAM; 2Kx8 ROM; 1.0 to 15 MHz; 0 to +70 °C

MICROCONTROLLERS (cont.)

CMOS 8–bit (cont.)

PCB80C51BH–3	microcontroller; 128x8 RAM; 4Kx8 ROM; 1.2 to 16 MHz; 0 to +70 °C
PCB80C552	microcontroller; 256x8 RAM; 16–bit capture/compare timer/counter; watch–dog timer; two pulse–width modulated signals; 8–bit input to 10–bit ADC; I^{2}C bus; 1.2 to 12 MHz; 0 to +70 °C
PCB80C652	microcontroller; 256x8 RAM; serial I/O; UART; I^{2}C bus; 1.2 to 12 MHz; 0 to +70 °C
PCB83C552	microcontroller; 256x8 RAM; 8Kx8 ROM; 16–bit capture/compare timer/counter; watch–dog timer; two pulse–width modulated signals; 8–bit to 10–bit ADC; I^{2}C bus; 1.2 to 12 MHZ; 0 to +70 °C
PCB83C652	microcontroller; 256x8 RAM; 8Kx8 ROM; serial I/O; UART; I^{2}C bus; 1.2 to 12 MHz; 0 to +70 °C
PCB83C654	microcontroller; 256x8 RAM; 16Kx8 ROM; serial I/O; UART; I^{2}C bus; 1.2 to 12 MHz; 0 to +70 °C
PCF80C31BH–3	microcontroller; 128x8 RAM; 1.2 to 12 MHz; –40 to + 85 °C
PCF80C39	microcontroller; 128x8 RAM; 1.0 to 15 MHz; –40 to +85 °C
PCF80C49	microcontroller; 128x8 RAM; 2Kx8 ROM; 1.0 to 15 MHz; –40 to +85 °C
PCF80C51BH–3	microcontroller; 128x8 RAM; 4Kx8 ROM; 1.2 to 12 MHz; –40 to +85 °C
PCF80C552	microcontroller; 256x8 RAM; 16–bit capture/compare timer/counter; watch–dog timer; two pulse–width modulated signals; 8–bit input to 10–bit ADC; I^{2}C bus; 1.2 to 12 MHz; –40 to +85 °C
PCF80C652	microcontroller; 256x8 RAM; serial I/O; UART: I^{2}C bus; 1.2 to 12 MHz; –40 to +85 °C
PCF83C552	microcontroller; 256x8 RAM; 8Kx8 ROM; 16–bit capture/compare timer/counter; watch–dog timer; two pulse–width modulated signals; 8–bit to 10–bit ADC; I^{2}C bus; 1.2 to 12 MHZ; –40 to +85 °C
PCF83C652	microcontroller; 256x8 RAM; 8Kx8 ROM; serial I/O; UART; I^{2}C bus; 1.2 to 12 MHz; –40 to +85 °C
PCF83C654	microcontroller; 256x8 RAM; 16Kx8 ROM; serial I/O; UART; I^{2}C bus; 1.2 to 12 MHz; –40 to +85 °C
PCF84C00	microcontroller; 256x8 RAM; bond–out version PCF84CXX family; I^{2}C bus
PCF84C12	low cost microcontroller; 64x8 RAM; 1Kx8 ROM
PCF84C21	microcontroller; 64x8 RAM; 2Kx8 ROM; plus 8–bit LED driver; I^{2}C bus; –40 to +85 °C
PCF84C41	microcontroller; 128x8 RAM; 4Kx8 ROM; plus 8–bit LED driver; I^{2}C bus; –40 to +85 °C
PCF84C81	microcontroller; 256x8 RAM; 8Kx8 ROM; plus 8–bit LED driver; I^{2}C bus; –40 to +85 °C
PCF84C85	microcontroller; 256x8 RAM; 8Kx8 ROM; 32 I/O; plus 8–bit LED driver; I^{2}C bus; –40 to +85 °C

MICROCONTROLLERS (cont.)

NMOS 8–bit

MAB8401	microcontroller; 128x8 RAM; bond–out version for MAB84XX family plus 8–bit LED driver; I^{2}C bus; 1.0 to 6 MHz; 0 to +70 °C
MAB8411	microcontroller; 64x8 RAM; 1Kx8 ROM plus 8–bit LED driver; I^{2}C bus; 1.0 to 6 MHz; 0 to +70 °C
MAB8421	microcontroller; 64x8 RAM; 2Kx8 ROM plus 8–bit LED driver; 20 I/O lines; I^{2}C bus; 1.0 to 6 MHz; 0 to +70 °C
MAB8422	microcontroller; 64x8 RAM; 2Kx8 ROM plus 8–bit LED driver; 15 I/O lines; I^{2}C bus; 1.0 to 6 MHz; 0 to +70 °C
MAB8441	microcontroller; 128x8 RAM; 4Kx8 ROM plus 8–bit LED driver; 20 I/O lines; I^{2}C bus; 1.0 to 6 MHz; 0 to +70 °C
MAB8442	microcontroller; 128x8 RAM; 4Kx8 ROM plus 8–bit LED driver; 15 I/O lines; I^{2}C bus; 1.0 to 6 MHz; 0 to +70 °C
MAB8461	microcontroller; 128x8 RAM; 6Kx8 ROM plus 8–bit LED driver; I^{2}C bus; 1.0 to 6 MHz; 0 to +70 °C
MAF84A11	microcontroller; 64x8 RAM; 1Kx8 ROM; I^{2}C bus; 1.0 to 5.12 MHz; –40 to +110 °C
MAF84A21	microcontroller; 64x8 RAM; 2Kx8 ROM plus 8–bit LED driver; 20 I/O lines; I^{2}C bus; 1.0 to 5.12 MHz; –40 to +110 °C
MAF84A22	microcontroller; 64x8 RAM; 2Kx8 ROM plus 8–bit LED driver; 15 I/O lines; I^{2}C bus; 1.0 to 5.12 MHz; –40 to +110 °C
MAF84A41	microcontroller; 128x8 RAM; 4Kx8 ROM plus 8–bit LED driver; 20 I/O lines; I^{2}C bus; 1.0 to 5.12 MHz; –40 to +110 °C
MAF84A42	microcontroller; 128x8 RAM; 4Kx8 ROM plus 8–bit LED driver; 15 I/O lines; I^{2}C bus; 1.0 to 5.12 MHz; –40 to +110 °C
MAF84A61	microcontroller; 128x8 RAM; 6Kx8 ROM plus 8–bit LED driver; I^{2}C bus; 1.0 to 5.12 MHz; –40 to +110 °C
MAF8411	microcontroller; 64x8 RAM; 1Kx8 ROM plus 8–bit LED driver; I^{2}C bus; 1.0 to 6 MHz; –40 to +85 °C
MAF8421	microcontroller; 64x8 RAM; 2Kx8 ROM plus 8–bit LED driver; 20 I/O lines; I^{2}C bus; 1.0 to 6 MHz; –40 to +85 °C
MAF8422	microcontroller; 64x8 RAM; 2Kx8 ROM plus 8–bit LED driver; 15 I/O lines; I^{2}C bus; 1.0 to 6 MHz; –40 to +85 °C
MAF8441	microcontroller; 128x8 RAM; 4Kx8 ROM plus 8–bit LED driver; 20 I/O lines; I^{2}C bus; 1.0 to 6 MHz; –40 to +85 °C
MAF8442	microcontroller; 128x8 RAM; 4Kx8 ROM plus 8–bit LED driver; 15 I/O lines; I^{2}C bus; 1.0 to 6 MHz; –40 to +85 °C
MAF8461	microcontroller; 128x8 RAM; 6Kx8 ROM plus 8–bit LED driver; I^{2}C bus; 1.0 to 6 MHz; –40 to +85 °C

MOTOR CONTROLLERS

TDA1059B	motor speed regulator with thermal shut–down; multiplication coefficient = 9; drop–out voltage = 1.8 V
TDA5040	DC motor drive circuit with magnetic–field detector
TDA5045	DC motor drive circuit with magnetic–field detector
TDA5140	DC scanner motor driver

PERSONAL RADIO/AUDIO

TDA7000	FM radio circuit; mono (in plastic DIL–18)
TDA7010	FM radio circuit; mono (in SO–16 plastic mini–pack)
TDA7021	FM radio circuit; stereo/mono; for low voltage micro tuning system (MTS)
TDA7030	low voltage micro tuning system (MTS)
TDA7040	PLL stereo decoder; low voltage
TDA7050	150 mW BTL or 2x75 mW stereo audio power amplifier; low voltage
TDA7052	1 W BTL mono audio amplifier for portable applications
TDA7053	2x1 W BTL stereo audio power amplifier for portable applications
TEA0670	Dolby B & C processor with preamplifier and electronic switch; low voltage
TEA5551	single–chip AM radio circuit, plus dual AF amplifier, for pocket receivers with headphones

RADIO RECEIVERS

AM

TDA1072A	AM receiver circuit for hi–fi and car radio
TDA1572	AM receiver circuit for stereo hi–fi and car radio
TDB1080	IF limiting amplifier, FM detector and audio amplifier
TEA6200	AM upconversion radio receiver; 10.7 MHz IF

AM/FM

TEA5570	AM/FM radio receiver circuit
TEA5591	AM/FM radio receiver circuit

FM

CA3089	FM IF system
NE605	low–power FM IF system
SAA7579	radio data system decoder
SA605	low–power FM IF system
TDA1574	integrated FM tuner for radio receivers
TDA1576	FM/IF amplifier and detector
TDA1596	FM/IF amplifier and detector
TDA7000	FM radio circuit; mono (in plastic DIL–18)
TDA7010	FM radio circuit; mono (in SO–16 plastic mini–pack)
TDA7021	FM radio circuit; stereo/mono; for low voltage micro tuning system (MTS)
TEA5560	FM/IF system

RADIO RECEIVERS (cont.)

FM (cont.)

TEA6000	FM/IF system and microcomputer–based tuning interface; I²C bus
TEA6100	FM/IF system and microcomputer–based tuning interface; I²C bus

REMOTE CONTROLLERS

SAA3004	high performance transmitter (455 kHz) for infrared remote control; up to 448 commands
SAA3006	high performance transmitter (RC–5) for infrared remote control; up to 2048 commands
SAA3007	high performance transmitter (455 kHz) for infrared remote control; up to 1280 commands; low voltage
SAA3008	high performance transmitter (38 kHz) for infrared remote control; low voltage
SAA3009	infrared remote control decoder; decodes 64 commands (RECS80/RC–5); up to 32 subaddresses; high current output capability for direct LED drive
SAA3010	high–performance transmitter (RC–5) for infrared remote control; low voltage
SAA3027	infrared remote control transmitter (RC–5)
SAA3028	high performance transcoder (RC–5) for infrared remote control; I²C bus
SAA3049	infrared remote control decoder, low current version of SAA3009
SAF1032	receiver/decoder for infrared remote control
SAF1039	transmitter for infrared remote control
TDA3047	high performance receiver for infrared remote control; positive output voltage
TDA3048	high performance receiver for infrared remote control; negative output voltage

REMOTE I/O EXPANDERS

PCF8574	remote 8–bit I/O expander; I²C bus
PCF8574A	remote 8–bit I/O expander; I²C bus; different slave address

SOUND GENERATOR

SAA1099	stereo sound generator for sound effects and music synthesis (µC–controlled)

SPEECH SYNTHESIZERS

OM8000	standard Euro–card demo for voice synthesizer MEA8000
OM8200	speech demonstration board (PCF8200)
OM8201	speech demonstration box (PCF8200)
OM8209	update package for OM8010
OM8210	speech analysis/editing system (PCF8200)
PCF8200	voice synthesizer (CMOS); I²C bus

STEREO DECODERS

LM1870	stereo demodulator with blend
SAA7500	decoder for digital satellite sound
TDA1578A	time multiplex PLL stereo decoder for hi–fi and car radios
TDA1598	time multiplex PLL stereo decoder for hi–fi and car radios
TDA7040	PLL stereo decoder; low voltage
TEA5580	PLL stereo decoder for medium–fi and car radios
TEA5581	PLL stereo decoder with source selector switch for medium–fi and car radios
TSA6057	radio tuning PLL frequency synthesizer; I^2C bus
μA758	FM stereo multiplex decoder; PLL

TUNING ICs

HEF4750V	frequency synthesizer
HEF4751V	universal divider
SAA1057	radio tuning PLL frequency synthesizer (SYMO II)
SAA1300	tuner switching circuit; I^2C bus
SAB6456	sensitive 1 GHz divide–by–64/divide–by–256 switchable prescaler
TDA1574	integrated FM tuner for radio receivers
TDA7030	low voltage micro tuning system (MTS)
TDD1742	low power frequency synthesizer (LOPSY)

AMPLIFIERS

NE542	dual low–noise preamplifier
NE5230	low voltage operational amplifier
SA5230	low voltage operational amplifier
TDA7050	150 mW BTL or 2x75 mW stereo audio power amplifier; low voltage
TDA7052	1 W BTL mono audio amplifier for portable applications

CLOCK/CALENDAR

PCF8573	clock calendar; I²C bus
PCF8583	clock calendar with 256x8–bit static RAM; I²C bus

DATA CONVERSION

ADCs, DACs

PCF8591	8–bit ADC/DAC; I²C bus

CALL PROGRESS DECODER

NE5900	call progress decoder

DIALLER ICs

DTMF

PCD3311	DTMF generator with parallel data inputs; I²C bus
PCD3311A	DTMF/32–single tone generator with parallel data inputs; I²C bus
PCD3312	DTMF generator; I²C bus
PCF4420	dialler with redial, compatible with 3x4 keypad
PCF4421	dialler with redial plus access pause, flash and disconnect functions

Pulse

PCD3320C	dialler with redial; several mute signals; no access pause; mark/space ratio 3:2
PCD3321C	dialler with redial; manual and two automatic access pauses; mark/space ratio 3:2 and 2:1
PCD3322C	variant of PCD3320C
PCD3323	dialler for sophisticated PABX applications
PCD3324C	variant of PCD3321C; one automatic access pause
PCD3325C	dialler with manual access pause control
PCD3326C	variant of PCD3321C with selectable access pause
PCD3327C	variant of PCD3325C for ceramic resonator; automatic reset of access pause

Pulse/DTMF

PCD3310	pulse and DTMF dialler with redial; pulse dialling mark/space ratio 2:1; PABX register; notepad; flash; access pause by cursor method

DIALLER ICs (cont.)

Pulse/DTMF (cont.)

PCD3310A	variant of PCD3310 with mark/space ratio 3:2
PCD3310C	variant of PCD3310; dialling mode indicator output
PCD4410	pulse and DTMF dialler with redial; 3x4 keypad; flash; mark/space ratio 2:1; tone burst 70/140 ms; data memory
PCD4413	variant of PCD4410 without redial; mark/space ratio 3:2; tone burst 70/70 ms
PCD4413A	PCD4413 with flash time of 255 ms
PCD4415	PCD4410 for 3x4 or 3x5 keypad; tone burst 70/70 ms
PCD4415A	PCD4415 with mark/space ratio 3:2

Repertory

PCD3315/502	10–number repertory dialler with redial and DTMF generator for PCD3312; 4x5 keypad; 10 Hz
PCD3315/503	PCD3315/502 plus 10 name keys
PCD3315/512	PCD3315/503 plus 16 and 20 Hz options
PCD3315/513	PCD3315/503 plus Norwegian and Swedish key options
PCD3341	advanced 10–100 number repertory pulse/DTMF dialler; LCD control; I²C bus
PCD3344/004	up to 20 number repertory pulse/DTMF dialler with redial (max. 30 digits); music on hold; LCD control; specification options
PCD3344/006	up to 20 number repertory pulse/DTMF dialler (floating RAM); music on hold; on–hook dialling and listening–in control; specification options

DISPLAY DRIVERS

PCF2111	LCD duplex driver; 64 segments
PCF2201	LCD flat panel row/column driver
PCF8566	universal LCD driver for low multiplex rates (1:1 to 1:4); max. 96 elements; I²C bus
PCF8576	universal LCD driver for low multiplex rates 1:1 to 1:4); max. 160 segments; I²C bus
PCF8577	LCD direct driver (32 segments) or duplex driver (64 segments); I²C bus
PCF8577A	LCD direct driver (32 segments) or duplex driver (64 segments); I²C bus; different slave address
PCF8578	LCD row/column driver for dot matrix graphic displays; 40 outputs, of which 24 are programmable; I²C bus
PCF8579	LCD column driver for dot matrix graphic displays; 40 column outputs; I²C bus

I²C BUS ICs

PCB80C552	microcontroller; 256x8 RAM; 16–bit capture/compare timer/counter; watch–dog timer; two pulse–width modulated signals; 8–bit input to 10–bit ADC; I²C bus; 1.2 to 12 MHz; 0 to +70 °C
PCB80C652	microcontroller; 256x8 RAM; serial I/O; UART; I²C bus; 1.2 to 12 MHz; 0 to +70 °C
PCB83C652	microcontroller; 256x8 RAM; 8Kx8 ROM; serial I/O; UART; I²C bus; 1.2 to 12 MHz; 0 to +70 °C

I^{2}C BUS ICs (cont.)

PCD3311	DTMF generator with parallel data inputs; I^{2}C bus
PCD3311A	DTMF/32–single tone generator with parallel data inputs; I^{2}C bus
PCD3312	DTMF generator; I^{2}C bus
PCD3315C	microcontroller for telephone sets; 160x8 RAM; 1.5Kx8 ROM; 20 I/O lines; I^{2}C bus
PCD3341	advanced 10–100 number repertory pulse/DTMF dialler; LCD control; I^{2}C bus
PCD3343	microcontroller for telephone sets; 224x8 RAM; 3Kx8 ROM; 20 I/O lines; I^{2}C bus
PCD3344	microcontroller with on–chip DTMF generator; 224x8 RAM; 2Kx8 ROM; 20 I/O lines; I^{2}C bus
PCD3346	microcontroller for telephone sets; 128x8 RAM; 4Kx8 ROM; 256x8 EEPROM; 20 I/O lines; I^{2}C bus
PCD3347	microcontroller with on–chip DTMF generator; 64x8 RAM; 1.5Kx8 ROM; 13 I/O lines; I^{2}C bus
PCD3348	microcontroller for telephone sets; 256x8 RAM; 8Kx8 ROM; 20 I/O lines; I^{2}C bus
PCD3349	microcontroller with on–chip DTMF generator; 224x8 RAM; 4Kx8 ROM; 20 I/O lines; I^{2}C bus
PCF8200	voice synthesizer (CMOS); I^{2}C bus
PCF8566	universal LCD driver for low multiplex rates (1:1 to 1:4); max. 96 elements; I^{2}C bus
PCF8570	256x8–bit static RAM; I^{2}C bus
PCF8571	128x8–bit static RAM; I^{2}C bus
PCF8573	clock calendar; I^{2}C bus
PCF8574	remote 8–bit I/O expander; I^{2}C bus
PCF8574A	remote 8–bit I/O expander; I^{2}C bus; different slave address
PCF8576	universal LCD driver for low multiplex rates 1:1 to 1:4); max. 160 segments; I^{2}C bus
PCF8577	LCD direct driver (32 segments) or duplex driver (64 segments); I^{2}C bus
PCF8577A	LCD direct driver (32 segments) or duplex driver (64 segments); I^{2}C bus; different slave address
PCF8582A	256x8–bit EEPROM; I^{2}C bus
PCF8591	8–bit ADC/DAC; I^{2}C bus
SCC68070	microprocessor; 16/32–bit MPU; 68000 CPU; MMU; DMA; timer; UART; I^{2}C bus
UMA1000	data processor for cellular radio (DPROC); I^{2}C bus
UMA1010	low–power universal frequency synthesizer for radio communications; 400 to 1150 MHz; I^{2}C bus
UMA1012	low power universal frequency synthesizer for radio communications; I^{2}C bus; up to 550 MHz

MEMORIES

FCB61C61–35	65536x1–bit high–speed CMOS static RAM; access time 35 ns
FCB61C61–45	65536x1–bit high–speed CMOS static RAM; access time 45 ns
FCB61C61–55	65536x1–bit high–speed CMOS static RAM; access time 55 ns
FCB61C61L–35	65536x1–bit high–speed CMOS low–power static RAM; access time 35 ns
FCB61C61L–45	65536x1–bit high–speed CMOS low–power static RAM; access time 45 ns
FCB61C61L–55	65536x1–bit high–speed CMOS low–power static RAM; access time 55 ns

MEMORIES (cont.)

FCB61C62–35	16384x4–bit high–speed CMOS static RAM; access time 35 ns
FCB61C62–45	16384x4–bit high–speed CMOS static RAM; access time 45 ns
FCB61C62–55	16384x4–bit high–speed CMOS static RAM; access time 55 ns
FCB61C62L–35	16384x4–bit high–speed CMOS low–power static RAM; access time 35 ns
FCB61C62L–45	16384x4–bit high–speed CMOS low–power static RAM; access time 45 ns
FCB61C62L–55	16384x4–bit high–speed CMOS low–power static RAM; access time 55 ns
FCB61C65–45	8192x8–bit high–speed CMOS static RAM; access time 45 ns
FCB61C65–55	8192x8–bit high–speed CMOS static RAM; access time 55 ns
FCB61C65–70	8192x8–bit high–speed CMOS static RAM; access time 70 ns
FCB61C65L–45	8192x8–bit high–speed CMOS low–power static RAM; access time 45 ns
FCB61C65L–55	8192x8–bit high–speed CMOS low–power static RAM; access time 55 ns
FCB61C65L–70	8192x8–bit high–speed CMOS low–power static RAM; access time 70 ns
PCF8570	256x8–bit static RAM; I^2C bus
PCF8571	128x8–bit static RAM; I^2C bus
PCF8582A	256x8–bit EEPROM; I^2C bus

MICROCONTROLLERS

PCB80C552	microcontroller; 256x8 RAM; 16–bit capture/compare timer/counter; watch–dog timer; two pulse–width modulated signals; 8–bit input to 10–bit ADC; I^2C bus; 1.2 to 12 MHz; 0 to +70 °C
PCB80C652	microcontroller; 256x8 RAM; serial I/O; UART; I^2C bus; 1.2 to 12 MHz; 0 to +70 °C
PCB80C851	microcontroller; 128x8 RAM; 256x8 EEPROM; 1.2 to 12 MHz; 0 to +70 °C
PCB83C851	microcontroller; 128x8 RAM; 4Kx8 ROM; 256x8 EEPROM; 1.2 to 12 MHz; 0 to +70 °C
PCD3300B	28/28–pin piggyback version for PCD33XX family without DTMF
PCD3315C	microcontroller for telephone sets; 160x8 RAM; 1.5Kx8 ROM; 20 I/O lines; I^2C bus
PCD3343	microcontroller for telephone sets; 224x8 RAM; 3Kx8 ROM; 20 I/O lines; I^2C bus
PCD3344	microcontroller with on–chip DTMF generator; 224x8 RAM; 2Kx8 ROM; 20 I/O lines; I^2C bus
PCD3344B	28/28–pin piggyback version for PCD33XX family with DTMF
PCD3346	microcontroller for telephone sets; 128x8 RAM; 4Kx8 ROM; 256x8 EEPROM; 20 I/O lines; I^2C bus
PCD3347	microcontroller with on–chip DTMF generator; 64x8 RAM; 1.5Kx8 ROM; 13 I/O lines; I^2C bus
PCD3348	microcontroller for telephone sets; 256x8 RAM; 8Kx8 ROM; 20 I/O lines; I^2C bus
PCD3349	microcontroller with on–chip DTMF generator; 224x8 RAM; 4Kx8 ROM; 20 I/O lines; I^2C bus

MOBILE TELEPHONES

CA3089	FM IF system
MC3361	low power FM IF system
NE567	tone/frequency decoder PLL
NE570	compandor
NE571	compandor
NE572	programmable analog compandor
NE575	low voltage dual expander/single compandor or automatic level controller
NE602	double–balanced mixer and oscillator
NE604	low power narrow band FM IF system
NE605	low–power FM IF system
NE612	double balanced mixer and oscillator
NE614	low power FM IF system
PCB80C552	microcontroller; 256x8 RAM; 16–bit capture/compare timer/counter; watch–dog timer; two pulse–width modulated signals; 8–bit input to 10–bit ADC; I^2C bus; 1.2 to 12 MHz; 0 to +70 °C
PCB80C652	microcontroller; 256x8 RAM; serial I/O; UART; I^2C bus; 1.2 to 12 MHz; 0 to +70 °C
PCB80C851	microcontroller; 128x8 RAM; 256x8 EEPROM; 1.2 to 12 MHz; 0 to +70 °C
PCB83C851	microcontroller; 128x8 RAM; 4Kx8 ROM; 256x8 EEPROM; 1.2 to 12 MHz; 0 to +70 °C
PCD3311A	DTMF/32–single tone generator with parallel data inputs; I^2C bus
PCD3312	DTMF generator; I^2C bus
PCD3315/502	10–number repertory dialler with redial and DTMF generator for PCD3312; 4x5 keypad; 10 Hz
PCF80C851	microcontroller; 128x8 RAM; 256x8 EEPROM; 1.2 to 12 MHz; –40 to +85 °C
PCF83C851	microcontroller; 128x8 RAM; 4Kx8 ROM; 256x8 EEPROM; 1.2 to 12 MHz; –40 to +85 °C
PCF8591	8–bit ADC/DAC; I^2C bus
SA571	compandor
SA572	programmable analog compandor
SA575	low voltage dual expander/single compandor or automatic level controller
SA602	double–balanced mixer and oscillator
SA604	low power narrow band FM IF system
SA605	low–power FM IF system
SE567	tone/frequency decoder PLL
TDA7050	150 mW BTL or 2x75 mW stereo audio power amplifier; low voltage
TDA7052	1 W BTL mono audio amplifier for portable applications
TDD1742	low power frequency synthesizer (LOPSY)
UMA1000	data processor for cellular radio (DPROC); I^2C bus
UMA1010	low–power universal frequency synthesizer for radio communications; 400 to 1150 MHz; I^2C bus
UMA1012	low power universal frequency synthesizer for radio communications; I^2C bus; up to 550 MHz

POWER SUPPLY ICs

TEA1081	supply circuit with power–down for telephone set peripherals

REMOTE I/O EXPANDERS

PCF8574	remote 8–bit I/O expander; I^{2}C bus
PCF8574A	remote 8–bit I/O expander; I^{2}C bus; different slave address

SPEECH SYNTHESIZERS

OM8000	standard Euro–card demo for voice synthesizer MEA8000
OM8200	speech demonstration board (PCF8200)
OM8201	speech demonstration box (PCF8200)
OM8209	update package for OM8010
OM8210	speech analysis/editing system (PCF8200)
PCF8200	voice synthesizer (CMOS); I^{2}C bus

SPEECH–TRANSMISSION

TEA1042	telephone transmission circuit for handsfree loudspeaking
TEA1060	speech/transmission circuit with dialler interface; low impedance input for dynamic and magnetic microphones
TEA1061	speech/transmission circuit with dialler interface; high impedance input for electret and piezoelectric microphones
TEA1063	low voltage speech circuit with dialler interface and speech–controlled transmit level dynamic limiting
TEA1064	speech/transmission circuit with dialler interface and transmit level dynamic limiting
TEA1066	speech/transmission circuit with dialler interface
TEA1067	low voltage speech/transmission circuit with dialler interface; input suitable for all microphone types
TEA1068	speech/transmission circuit with dialler interface; input suitable for all microphone types

TONE RINGERS

PCD3360	programmable multi–tone ringer
UBA1094	3–tone ringer circuit for telephones

CORDLESS TELEPHONES

MC3361	low power FM IF system
NE567	tone/frequency decoder PLL
NE575	low voltage dual expander/single compandor or automatic level controller
PCD3315/534	microcontroller for cordless remote unit
PCD3344	microcontroller with on–chip DTMF generator; 224x8 RAM; 2Kx8 ROM; 20 I/O lines; I^{2}C bus
PC74HC4046A	phase–locked loop with VCO

ISDN

PCB83C652	microcontroller; 256x8 RAM; 8Kx8 ROM; serial I/O; UART; I^{2}C bus; 1.2 to 12 MHz; 0 to +70 °C
PCB2310	IST bus interface
PCB2320	data rate adapter
PCB2390	LTT–4B/3T echo canceller

ISDN (cont.)

PCB5010	single–chip digital signal processor; 8 MHz; on–chip program memory 987x40–bit ROM (mask programmable), 32x40–bit RAM (loaded via bus), 5x40–bit ROM (fixed load–RAM program); on–chip data memory 512x16–bit ROM (mask programmable), 2x(128x16–bit) static RAM
PCB5011	single–chip digital signal processor; 8 MHz; ROMless bond–out version; external program memory 1024x40–bit (expandable to 64Kx40–bit); external data memory 512x16–bit (read and write possible) plus 2x(128x16–bit) on–chip static RAM
PCF5010	single–chip digital signal processor; 8 MHz; on–chip program memory 987x40–bit ROM (mask programmable), 32x40–bit RAM (loaded via bus), 5x40–bit ROM (fixed load–RAM program); on–chip data memory 512x16–bit ROM (mask programmable), 2x(128x16–bit) static RAM
PCF5011	single–chip digital signal processor; 8 MHz; ROMless bond–out version; external program memory 1024x40–bit (expandable to 64Kx40–bit); external data memory 512x16–bit (read and write possible); plus 2x(128x16–bit) on–chip static RAM
SCC68070	microprocessor; 16/32–bit MPU; 68000 CPU; MMU; DMA; timer; UART; I^{2}C bus

RADIO PAGERS

PCA5000	decoder for POCSAG paging systems
TDA7052	1 W BTL mono audio amplifier for portable applications
UAA2033	digital paging receiver; low power

AMPLIFIERS

NE592	video amplifier
NE5539	ultra high frequency operational amplifier
NE5592	video amplifier
SE592	video amplifier
SE5539	ultra high frequency operational amplifier
TDA6100	8 MHz video output amplifier
μA733	differential video amplifier
μA733C	differential video amplifier

CAMERA ICs

SAA1043	universal sync generator
SAA1044	subcarrier coupler circuit
SAA1101	universal sync generator
SAD1019	multi–norm pulse pattern generator

CLOCK/CALENDAR

PCF8573	clock calendar; I^2C bus
PCF8583	clock calendar with 256x8–bit static RAM; I^2C bus

COLOUR DECODERS

SAA9051	digital multistandard TV decoder (S–DMSD) with separate chrominance and luminance inputs; I^2C bus
SAA9055	digital SECAM colour decoder; I^2C bus
TDA3501	video control combination
TDA3505	video control combination with automatic cut–off control; –(B–Y) and –(R–Y) input
TDA3506	video control combination with automatic cut–off control; +(B–Y) and +(R–Y) input
TDA3507	video control combination with automatic cut–off control; –(B–Y) and –(R–Y) input
TDA3510	PAL decoder
TDA3561A	PAL decoder
TDA3564	NTSC decoder without RGB inputs
TDA3565	PAL decoder
TDA3566	PAL/NTSC decoder
TDA3567	NTSC decoder
TDA3569	NTSC decoder with fast RGB blanking
TDA3590A	SECAM processor circuit (improved TDA3590)
TDA3592A	SECAM/PAL transcoder
TDA4510	PAL decoder
TDA4532	SECAM decoder
TDA4555	multistandard decoder for –(R–Y) and –(B–Y) signals
TDA4556	multistandard decoder for +(R–Y) and +(B–Y) signals
TDA4560	colour transient improvement circuit
TDA4565	colour transient improvement circuit; output signal delayed 180 μs less than that of TDA4560
TDA4570	NTSC decoder
TDA4580	video control combination with automatic cut–off control

COLOUR DECODERS (cont.)

TDA8390	single–chip PAL decoder and RGB matrix
TDA8442	I^{2}C bus interface for colour decoders
TDA8443	I^{2}C bus–controlled YUV/RGB interface circuit
TDA8443A	I^{2}C bus–controlled YUV/RGB interface circuit
TDA8451	P2CCD delay line and matrix for colour decoders
TDA8452	P2CCD filter combination for colour decoders
TDA8461	PAL/NTSC decoder; I^{2}C bus
TDA8490	SECAM decoder
TDA9080	video control combination circuit

DATA CONVERSION

ADCs, DACs

NE5150	RGB video DAC
NE5151	RGB video DAC
NE5152	RGB video DAC
PCF8591	8–bit ADC/DAC; I^{2}C bus
PNA7509	7–bit ADC; 22 MHz; 3–state output
PNA7518	8–bit multiplying DAC; 30 MHz
SAA9079	DAC for digital TV; low level
SAD1009	universal DAC (UDAC)
TDA1534	14–bit ADC
TDA1541A	dual 16–bit DAC
TDA1543	dual 16–bit economy DAC (I^{2}S bus format)
TDA1543A	dual 16–bit economy DAC (Japanese format)
TDA8444	octuple 6–bit DAC; I^{2}C bus
TDA8702	8–bit high–performance, high–speed video DAC; 30 MHz (max.); TTL–compatible
TDA8703	8–bit high–performance, high–speed ADC; 40 MHz (max.); TTL–compatible
TDA8706	6–bit video DAC with three analogue inputs, clamps and 3:1 multiplexer; for picture–in–picture; TTL compatible
TDA8708	8–bit video DAC; 30 MHz (max.); 1–out–of–3 input selector, clamp and automatic gain control
TDE8715	8–bit high–performance, high–speed ADC; 50 MHz (max.); ECL compatible

DIGITAL PROCESSING

SAA9050	digital multistandard TV decoder; I^{2}C bus
SAA9051	digital multistandard TV decoder (S–DMSD) with separate chrominance and luminance inputs; I^{2}C bus
SAA9055	digital SECAM colour decoder; I^{2}C bus
SAA9057	clock generator circuit
SAA9058	sample rate converter
SAA9060	video digital–to–analogue converter (VDAC)
SAA9062	digital deflection controller (DDC) option 1 with on–chip ROM/RAM; ROM preprogrammed for 45AX picture tubes; RAM programmable for other picture tubes; 50/60 Hz vertical frequency; 16 kHz line frequency; I^{2}C bus

DIGITAL PROCESSING (cont.)

SAA9063	digital deflection controller (DDC) option 2 with on–chip ROM/RAM; ROM preprogrammed for 45AX picture tubes; RAM programmable for other picture tubes; 50/60 Hz vertical frequency; 31 kHz line frequency; I^2C bus
SAA9064	digital deflection controller (DDC) option 3 with on–chip ROM/RAM; ROM preprogrammed for 45AX picture tubes; RAM programmable for other picture tubes; 100/120 Hz vertical frequency; 31 kHz line frequency; I^2C bus
SAA9068	picture–in–picture controller (PIPCO); I^2C bus
SAA9069	digital vertical filter (DVF)
SAA9079	DAC for digital TV; low level

DISPLAY DRIVERS

PCF1303	18–element bar graph LCD driver (with analogue input)
PCF2100	LCD duplex driver; 40 segments
PCF2110	LCD duplex driver; 60 segments and 2 LEDs
PCF2111	LCD duplex driver; 64 segments
PCF2112	LCD driver; 32 segments
PCF2201	LCD flat panel row/column driver
PCF8566	universal LCD driver for low multiplex rates (1:1 to 1:4); max. 96 elements; I^2C bus
PCF8576	universal LCD driver for low multiplex rates 1:1 to 1:4); max. 160 segments; I^2C bus
PCF8577	LCD direct driver (32 segments) or duplex driver (64 segments); I^2C bus
PCF8577A	LCD direct driver (32 segments) or duplex driver (64 segments); I^2C bus; different slave address
PCF8578	LCD row/column driver for dot matrix graphic displays; 40 outputs, of which 24 are programmable; I^2C bus
PCF8579	LCD column driver for dot matrix graphic displays; 40 column outputs; I^2C bus
SAA1060	LED display/interface circuit
SAA1064	4–digit LED driver; I^2C bus

EAST–WEST CORRECTION

TDA1082	east–west correction driver circuit
TDA8432	vertical deflection processor for computer–controlled TV receivers
TDA8433	vertical deflection processor for computer–controlled TV receivers; I^2C bus; BIMOS successor to TDA8432

I^2C BUS ICs

MAB8401	microcontroller; 128x8 RAM; bond–out version for MAB84XX family plus 8–bit LED driver; I^2C bus; 1.0 to 6 MHz; 0 to +70 °C
MAB8411	microcontroller; 64x8 RAM; 1Kx8 ROM plus 8–bit LED driver; I^2C bus; 1.0 to 6 MHz; 0 to +70 °C
MAB8421	microcontroller; 64x8 RAM; 2Kx8 ROM plus 8–bit LED driver; 20 I/O lines; I^2C bus; 1.0 to 6 MHz; 0 to +70 °C

I^{2}C BUS ICs (cont.)

MAB8422	microcontroller; 64x8 RAM; 2Kx8 ROM plus 8–bit LED driver; 15 I/O lines; I^{2}C bus; 1.0 to 6 MHz; 0 to +70 °C
MAB8441	microcontroller; 128x8 RAM; 4Kx8 ROM plus 8–bit LED driver; 20 I/O lines; I^{2}C bus; 1.0 to 6 MHz; 0 to +70 °C
MAB8442	microcontroller; 128x8 RAM; 4Kx8 ROM plus 8–bit LED driver; 15 I/O lines; I^{2}C bus; 1.0 to 6 MHz; 0 to +70 °C
MAB8461	microcontroller; 128x8 RAM; 6Kx8 ROM plus 8–bit LED driver; I^{2}C bus; 1.0 to 6 MHz; 0 to +70 °C
MAF84A11	microcontroller; 64x8 RAM; 1Kx8 ROM; I^{2}C bus; 1.0 to 5.12 MHz; –40 to +110 °C
MAF84A21	microcontroller; 64x8 RAM; 2Kx8 ROM plus 8–bit LED driver; 20 I/O lines; I^{2}C bus; 1.0 to 5.12 MHz; –40 to +110 °C
MAF84A22	microcontroller; 64x8 RAM; 2Kx8 ROM plus 8–bit LED driver; 15 I/O lines; I^{2}C bus; 1.0 to 5.12 MHz; –40 to +110 °C
MAF84A41	microcontroller; 128x8 RAM; 4Kx8 ROM plus 8–bit LED driver; 20 I/O lines; I^{2}C bus; 1.0 to 5.12 MHz; –40 to +110 °C
MAF84A42	microcontroller; 128x8 RAM; 4Kx8 ROM plus 8–bit LED driver; 15 I/O lines; I^{2}C bus; 1.0 to 5.12 MHz; –40 to +110 °C
MAF84A61	microcontroller; 128x8 RAM; 6Kx8 ROM plus 8–bit LED driver; I^{2}C bus; 1.0 to 5.12 MHz; –40 to +110 °C
MAF8411	microcontroller; 64x8 RAM; 1Kx8 ROM plus 8–bit LED driver; I^{2}C bus; 1.0 to 6 MHz; –40 to +85 °C
MAF8421	microcontroller; 64x8 RAM; 2Kx8 ROM plus 8–bit LED driver; 20 I/O lines; I^{2}C bus; 1.0 to 6 MHz; –40 to +85 °C
MAF8422	microcontroller; 64x8 RAM; 2Kx8 ROM plus 8–bit LED driver; 15 I/O lines; I^{2}C bus; 1.0 to 6 MHz; –40 to +85 °C
MAF8441	microcontroller; 128x8 RAM; 4Kx8 ROM plus 8–bit LED driver; 20 I/O lines; I^{2}C bus; 1.0 to 6 MHz; –40 to +85 °C
MAF8442	microcontroller; 128x8 RAM; 4Kx8 ROM plus 8–bit LED driver; 15 I/O lines; I^{2}C bus; 1.0 to 6 MHz; –40 to +85 °C
MAF8461	microcontroller; 128x8 RAM; 6Kx8 ROM plus 8–bit LED driver; I^{2}C bus; 1.0 to 6 MHz; –40 to +85 °C
PCA80C552	microcontroller; 256x8 RAM; 16–bit capture/compare timer/counter; watch–dog timer; 2 pulse–width modulated signals; 8–bit input to 10–bit ADC; I^{2}C bus; 1.2 to 12 MHz; –40 to +110 °C
PCA80C652	microcontroller; 256x8 RAM; serial I/O; UART; I^{2}C bus; 1.2 to 12 MHz; –40 to +110 °C
PCA83C552	microcontroller; 256x8 RAM; 8Kx8 ROM; 16–bit capture/compare timer/counter; watch–dog timer; 2 pulse–width modulated signals; 8–bit input to 10–bit ADC; I^{2}C bus; 1.2 to 12 MHz; –40 to +110 °C

I^{2}C BUS ICs (cont.)

PCA83C652	microcontroller; 256x8 RAM; 8Kx8 ROM; serial I/O; UART; I^{2}C bus; 1.2 to 12 MHz; –40 to +110 °C
PCA83C654	microcontroller; 256x8 RAM; 16Kx8 ROM; serial I/O; UART; I^{2}C bus; 1.2 to 12 MHz; –40 to +110 °C
PCB80C552	microcontroller; 256x8 RAM; 16–bit capture/ compare timer/counter; watch–dog timer; two pulse–width modulated signals; 8–bit input to 10–bit ADC; I^{2}C bus; 1.2 to 12 MHz; 0 to +70 °C
PCB83C552	microcontroller; 256x8 RAM; 8Kx8 ROM; 16–bit capture/compare timer/counter; watch–dog timer; two pulse–width modulated signals; 8–bit to 10–bit ADC; I^{2}C bus; 1.2 to 12 MHZ; 0 to +70 °C
PCB83C652	microcontroller; 256x8 RAM; 8Kx8 ROM; serial I/O; UART; I^{2}C bus; 1.2 to 12 MHz; 0 to +70 °C
PCB83C654	microcontroller; 256x8 RAM; 16Kx8 ROM; serial I/O; UART; I^{2}C bus; 1.2 to 12 MHz; 0 to +70 °C
PCF80C552	microcontroller; 256x8 RAM; 16–bit capture/compare timer/counter; watch–dog timer; 2 pulse–width modulated signals; 8–bit input to 10–bit ADC; I^{2}C bus; 1.2 to 12 MHz; –40 to +85 °C
PCF80C652	microcontroller; 256x8 RAM; serial I/O; UART: I^{2}C bus; 1.2 to 12 MHz; –40 to +85 °C
PCF83C552	microcontroller; 256x8 RAM; 8Kx8 ROM; 16–bit capture/compare timer/counter; watch–dog timer; 2 pulse–width modulated signals; 8–bit input to 10–bit ADC; I^{2}C bus; 1.2 to 12 MHz; –40 to +85 °C
PCF83C652	microcontroller; 256x8 RAM; 8Kx8 ROM; serial I/O; UART; I^{2}C bus; 1.2 to 12 MHz; –40 to +85 °C
PCF83C654	microcontroller; 256x8 RAM; 16Kx8 ROM; serial I/O; UART; I^{2}C bus; 1.2 to 12 MHz; –40 to +85 °C
PCF84C00	microcontroller; 256x8 RAM; bond–out version PCF84CXX family; I^{2}C bus
PCF84C12	low cost microcontroller; 64x8 RAM; 1Kx8 ROM
PCF84C21	microcontroller; 64x8 RAM; 2Kx8 ROM; plus 8–bit LED driver; I^{2}C bus; –40 to +85 °C
PCF84C41	microcontroller; 128x8 RAM; 4Kx8 ROM; plus 8–bit LED driver; I^{2}C bus; –40 to +85 °C
PCF84C81	microcontroller; 256x8 RAM; 8Kx8 ROM; plus 8–bit LED driver; I^{2}C bus; –40 to +85 °C
PCF84C85	microcontroller; 256x8 RAM; 8Kx8 ROM; 32 I/O; plus 8–bit LED driver; I^{2}C bus; –40 to +85 °C
PCF8566	universal LCD driver for low multiplex rates (1:1 to 1:4); max. 96 elements; I^{2}C bus
PCF8570	256x8–bit static RAM; I^{2}C bus
PCF8571	128x8–bit static RAM; I^{2}C bus
PCF8573	clock calendar; I^{2}C bus
PCF8574	remote 8–bit I/O expander; I^{2}C bus
PCF8576	universal LCD driver for low multiplex rates 1:1 to 1:4); max. 160 segments; I^{2}C bus
PCF8577	LCD direct driver (32 segments) or duplex driver (64 segments); I^{2}C bus
PCF8578	LCD row/column driver for dot matrix graphic displays; 40 outputs, of which 24 are programmable; I^{2}C bus
PCF8579	LCD column driver for dot matrix graphic displays; 40 column outputs; I^{2}C bus
PCF8582A	256x8–bit EEPROM; I^{2}C bus

I²C BUS ICs (cont.)

PCF8583	clock calendar with 256x8–bit static RAM; I²C bus
PCF8591	8–bit ADC/DAC; I²C bus
SAA1064	4–digit LED driver; I²C bus
SAA1300	tuner switching circuit; I²C bus
SAA3028	high performance transcoder (RC–5) for infrared remote control; I²C bus
SAA5243E	enhanced computer–controlled teletext circuit (CCT); 625–line system; I²C bus (West European language version)
SAA5243H	enhanced computer–controlled teletext circuit (CCT); 625–line system; I²C bus (East European language version)
SAA5243K	enhanced computer–controlled teletext circuit (CCT); 625–line system; I²C bus (Arabic and English version)
SAA5243L	enhanced computer–controlled teletext circuit (CCT); 625–line system; I²C bus (Arabic and Hebrew version)
SAA5245A	525–lin system enhanced computer–controlled teletext circuit (USECCT); I²C bus (West European language version)
SAA5246E	single–chip CMOS teletext processor for 625–line system; I²C bus (West European language version)
SAA9041A	digital video teletext (DVTB) processor for Philips digital TV system (525 and 625–line systems); I²C bus (West European language version)
SAA9050	digital multistandard TV decoder; I²C bus
SAA9051	digital multistandard TV decoder (S–DMSD) with separate chrominance and luminance inputs; I²C bus
SAA9055	digital SECAM colour decoder; I²C bus
SAA9062	digital deflection controller (DDC) option 1 with on–chip ROM/RAM; ROM preprogrammed for 45AX picture tubes; RAM programmable for other picture tubes; 50/60 Hz vertical frequency; 16 kHz line frequency; I²C bus
SAA9063	digital deflection controller (DDC) option 2 with on–chip ROM/RAM; ROM preprogrammed for 45AX picture tubes; RAM programmable for other picture tubes; 50/60 Hz vertical frequency; 31 kHz line frequency; I²C bus
SAA9064	digital deflection controller (DDC) option 3 with on–chip ROM/RAM; ROM preprogrammed for 45AX picture tubes; RAM programmable for other picture tubes; 100/120 Hz vertical frequency; 31 kHz line frequency; I²C bus
SAA9068	picture–in–picture controller (PIPCO); I²C bus
SAB3035	computer interface for tuning and control (CITAC); 8 DACs; I²C bus
SAB3036	computer interface for tuning and control (CITAC); without DACs; I²C bus
SAB3037	computer interface for tuning and control (CITAC); 4 DACs; I²C bus
SAF1135	dataline decoder
TDA8370	synchronization processor for TV; I²C bus

I²C BUS ICs (cont.)

TDA8405	TV and video recorder stereo/dual sound processor; I²C bus
TDA8420	hi–fi stereo audio processor; I²C bus
TDA8421	hi–fi stereo audio processor; I²C bus
TDA8425	hi–fi stereo audio processor; I²C bus
TDA8433	vertical deflection processor for computer–controlled TV receivers; I²C bus; BIMOS successor to TDA8432
TDA8440	video/audio switch for CTV receivers; I²C bus
TDA8442	I²C bus interface for colour decoders
TDA8443	I²C bus–controlled YUV/RGB interface circuit
TDA8443A	I²C bus–controlled YUV/RGB interface circuit
TDA8444	octuple 6–bit DAC; I²C bus
TDA8461	PAL/NTSC decoder; I²C bus

MEMORIES

FCB61C61–35	65536x1–bit high–speed CMOS static RAM; access time 35 ns
FCB61C61–45	65536x1–bit high–speed CMOS static RAM; access time 45 ns
FCB61C61–55	65536x1–bit high–speed CMOS static RAM; access time 55 ns
FCB61C61L–35	65536x1–bit high–speed CMOS low–power static RAM; access time 35 ns
FCB61C61L–45	65536x1–bit high–speed CMOS low–power static RAM; access time 45 ns
FCB61C61L–55	65536x1–bit high–speed CMOS low–power static RAM; access time 55 ns
FCB61C62–35	16384x4–bit high–speed CMOS static RAM; access time 35 ns
FCB61C62–45	16384x4–bit high–speed CMOS static RAM; access time 45 ns
FCB61C62–55	16384x4–bit high–speed CMOS static RAM; access time 55 ns
FCB61C62L–35	16384x4–bit high–speed CMOS low–power static RAM; access time 35 ns
FCB61C62L–45	16384x4–bit high–speed CMOS low–power static RAM; access time 45 ns
FCB61C62L–55	16384x4–bit high–speed CMOS low–power static RAM; access time 55 ns
FCB61C65–45	8192x8–bit high–speed CMOS static RAM; access time 45 ns
FCB61C65–55	8192x8–bit high–speed CMOS static RAM; access time 55 ns
FCB61C65–70	8192x8–bit high–speed CMOS static RAM; access time 70 ns
FCB61C65L–45	8192x8–bit high–speed CMOS low–power static RAM; access time 45 ns
FCB61C65L–55	8192x8–bit high–speed CMOS low–power static RAM; access time 55 ns
FCB61C65L–70	8192x8–bit high–speed CMOS low–power static RAM; access time 70 ns
PCF8570	256x8–bit static RAM; I²C bus
PCF8571	128x8–bit static RAM; I²C bus
PCF8582A	256x8–bit EEPROM; I²C bus
PCF8583	clock calendar with 256x8–bit static RAM; I²C bus

MICROCONTROLLERS

CMOS 8–bit

PCA80C31BH–3	microcontroller; 128x8 RAM; 1.2 to 12 MHz; –40 to +110 °C
PCA80C51BH–3	microcontroller; 128x8 RAM; 4Kx8 ROM; 1.2 to 12 MHz; –40 to +110 °C
PCA80C552	microcontroller; 256x8 RAM; 16–bit capture/compare timer/counter; watch–dog timer; two pulse–width modulated signals; 8–bit input to 10–bit ADC; I^2C bus; 1.2 to 12 MHz; –40 to +110 °C
PCA80C652	microcontroller; 256x8 RAM; serial I/O; UART; I^2C bus; 1.2 to 12 MHz; –40 to +110 °C
PCA83C552	microcontroller; 256x8 RAM; 8Kx8 ROM; 16–bit capture/compare timer/counter; watch–dog timer; two pulse–width modulated signals; 8–bit to 10–bit ADC; I^2C bus; 1.2 to 12 MHZ; –40 to +110 °C
PCA83C652	microcontroller; 256x8 RAM; 8Kx8 ROM; serial I/O; UART; I^2C bus; 1.2 to 12 MHz; –40 to +110 °C
PCA83C654	microcontroller; 256x8 RAM; 16Kx8 ROM; serial I/O; UART; I^2C bus; 1.2 to 12 MHz; –40 to +110 °C
PCB80C31BH–3	microcontroller; 128x8 RAM; 1.2 to 16 MHz; 0 to +70 °C
PCB80C39	microcontroller; 128x8 RAM; 1.0 to 15 MHz; 0 to +70 °C
PCB80C49	microcontroller; 128x8 RAM; 2Kx8 ROM; 1.0 to 15 MHz; 0 to +70 °C
PCB80C51BH–3	microcontroller; 128x8 RAM; 4Kx8 ROM; 1.2 to 16 MHz; 0 to +70 °C
PCB80C552	microcontroller; 256x8 RAM; 16–bit capture/compare timer/counter; watch–dog timer; two pulse–width modulated signals; 8–bit input to 10–bit ADC; I^2C bus; 1.2 to 12 MHz; 0 to +70 °C
PCB80C652	microcontroller; 256x8 RAM; serial I/O; UART; I^2C bus; 1.2 to 12 MHz; 0 to +70 °C
PCB83C552	microcontroller; 256x8 RAM; 8Kx8 ROM; 16–bit capture/compare timer/counter; watch–dog timer; two pulse–width modulated signals; 8–bit to 10–bit ADC; I^2C bus; 1.2 to 12 MHZ; 0 to +70 °C
PCB83C652	microcontroller; 256x8 RAM; 8Kx8 ROM; serial I/O; UART; I^2C bus; 1.2 to 12 MHz; 0 to +70 °C
PCB83C654	microcontroller; 256x8 RAM; 16Kx8 ROM; serial I/O; UART; I^2C bus; 1.2 to 12 MHz; 0 to +70 °C
PCF80C31BH–3	microcontroller; 128x8 RAM; 1.2 to 12 MHz; –40 to + 85 °C
PCF80C39	microcontroller; 128x8 RAM; 1.0 to 15 MHz; –40 to +85 °C
PCF80C49	microcontroller; 128x8 RAM; 2Kx8 ROM; 1.0 to 15 MHz; –40 to +85 °C
PCF80C51BH–3	microcontroller; 128x8 RAM; 4Kx8 ROM; 1.2 to 12 MHz; –40 to +85 °C
PCF80C552	microcontroller; 256x8 RAM; 16–bit capture/compare timer/counter; watch–dog timer; two pulse–width modulated signals; 8–bit input to 10–bit ADC; I^2C bus; 1.2 to 12 MHz; –40 to +85 °C

MICROCONTROLLERS (cont.)

CMOS 8–bit (cont.)

PCF80C652	microcontroller; 256x8 RAM; serial I/O; UART: I^{2}C bus; 1.2 to 12 MHz; –40 to +85 °C
PCF83C552	microcontroller; 256x8 RAM; 8Kx8 ROM; 16–bit capture/compare timer/counter; watch–dog timer; two pulse–width modulated signals; 8–bit to 10–bit ADC; I^{2}C bus; 1.2 to 12 MHZ; –40 to +85 °C
PCF83C652	microcontroller; 256x8 RAM; 8Kx8 ROM; serial I/O; UART; I^{2}C bus; 1.2 to 12 MHz; –40 to +85 °C
PCF83C654	microcontroller; 256x8 RAM; 16Kx8 ROM; serial I/O; UART; I^{2}C bus; 1.2 to 12 MHz; –40 to +85 °C

NMOS 8–bit

MAB8031AH–2	microcontroller; 128x8 RAM; 3.5 to 15 MHz; 0 to +70 °C
MAB8032AH	microcontroller; 256x8 RAM; 3.5 to 12 MHz; 0 to +70 °C
MAB8035HL	microcontroller; 64x8 RAM; 1.0 to 11 MHz; 0 to +70 °C
MAB8039HL	microcontroller; 128x8 RAM; 1.0 to 11 MHz; 0 to +70 °C
MAB8040HL	microcontroller; 256x8 RAM; 1.0 to 11 MHz; 0 to +70 °C
MAB8048H	microcontroller; 64x8 RAM; 1Kx8 ROM; 1.0 to 11 MHz; 0 to +70 °C
MAB8049H	microcontroller; 128x8 RAM; 2Kx8 ROM; 1.0 to 11 MHz; 0 to +70 °C
MAB8050H	microcontroller; 256x8 RAM; 4Kx8 ROM; 1.0 to 11 MHz; 0 to +70 °C
MAB8051AH–2	microcontroller; 128x8 RAM; 4Kx8 ROM; 3.5 to 12 MHz; 0 to +70 °C
MAB8052AH	microcontroller; 256x8 RAM; 8Kx8 ROM; 3.5 to 12 MHz; 0 to +70 °C
MAB8401	microcontroller; 128x8 RAM; bond–out version for MAB84XX family plus 8–bit LED driver; I^{2}C bus; 1.0 to 6 MHz; 0 to +70 °C
MAB8411	microcontroller; 64x8 RAM; 1Kx8 ROM plus 8–bit LED driver; I^{2}C bus; 1.0 to 6 MHz; 0 to +70 °C
MAB8421	microcontroller; 64x8 RAM; 2Kx8 ROM plus 8–bit LED driver; 20 I/O lines; I^{2}C bus; 1.0 to 6 MHz; 0 to +70 °C
MAB8422	microcontroller; 64x8 RAM; 2Kx8 ROM plus 8–bit LED driver; 15 I/O lines; I^{2}C bus; 1.0 to 6 MHz; 0 to +70 °C
MAB8441	microcontroller; 128x8 RAM; 4Kx8 ROM plus 8–bit LED driver; 20 I/O lines; I^{2}C bus; 1.0 to 6 MHz; 0 to +70 °C
MAB8442	microcontroller; 128x8 RAM; 4Kx8 ROM plus 8–bit LED driver; 15 I/O lines; I^{2}C bus; 1.0 to 6 MHz; 0 to +70 °C
MAB8461	microcontroller; 128x8 RAM; 6Kx8 ROM plus 8–bit LED driver; I^{2}C bus; 1.0 to 6 MHz; 0 to +70 °C
MAF80A31AH–2	microcontroller; 128x8 RAM; 3.5 to 12 MHz; –40 to +110 °C

MICROCONTROLLERS (cont.)

NMOS 8–bit (cont.)

MAF80A35HL	microcontroller; 64x8 RAM; 1.0 to 10 MHz; –40 to +110 °C
MAF80A39HL	microcontroller; 128x8 RAM; 1.0 to 10 MHz; –40 to +110 °C
MAF80A40HL	microcontroller; 256x8 RAM; 1.0 to 10 MHz; –40 to +110 °C
MAF80A48H	microcontroller; 64x8 RAM; 1Kx8 ROM; 1.0 to 10 MHz; –40 to +110 °C
MAF80A49H	microcontroller; 128x8 RAM; 2Kx8 ROM; 1.0 to 10 MHz; –40 to +110 °C
MAF80A50H	microcontroller; 256x8 RAM; 4Kx8 ROM; 1.0 to 10 MHz; –40 to +110 °C
MAF80A51AH–2	microcontroller; 128x8 RAM; 4Kx8 ROM; 3.5 to 12 MHz; –40 to +110 °C
MAF84A11	microcontroller; 64x8 RAM; 1Kx8 ROM; I^2C bus; 1.0 to 5.12 MHz; –40 to +110 °C
MAF84A21	microcontroller; 64x8 RAM; 2Kx8 ROM plus 8–bit LED driver; 20 I/O lines; I^2C bus; 1.0 to 5.12 MHz; –40 to +110 °C
MAF84A22	microcontroller; 64x8 RAM; 2Kx8 ROM plus 8–bit LED driver; 15 I/O lines; I^2C bus; 1.0 to 5.12 MHz; –40 to +110 °C
MAF84A41	microcontroller; 128x8 RAM; 4Kx8 ROM plus 8–bit LED driver; 20 I/O lines; I^2C bus; 1.0 to 5.12 MHz; –40 to +110 °C
MAF84A42	microcontroller; 128x8 RAM; 4Kx8 ROM plus 8–bit LED driver; 15 I/O lines; I^2C bus; 1.0 to 5.12 MHz; –40 to +110 °C
MAF84A61	microcontroller; 128x8 RAM; 6Kx8 ROM plus 8–bit LED driver; I^2C bus; 1.0 to 5.12 MHz; –40 to +110 °C
MAF8031AH–2	microcontroller; 128x8 RAM; 3.5 to 12 MHz; –40 to +85 °C
MAF8035HL	microcontroller; 64x8 RAM; 1.0 to 11 MHz; –40 to +85 °C
MAF8039HL	microcontroller; 128x8 RAM; 1.0 to 11 MHz; –40 to +85 °C
MAF8040HL	microcontroller; 256x8 RAM; 1.0 to 11 MHz; –40 to +85 °C
MAF8048H	microcontroller; 64x8 RAM; 1Kx8 ROM; 1.0 to 11 MHz; –40 to +85 °C
MAF8049H	microcontroller; 128x8 RAM; 2Kx8 ROM; 1.0 to 11 MHz; –40 to +85 °C
MAF8050H	microcontroller; 256x8 RAM; 4Kx8 ROM; 1.0 to 11 MHz; –40 to +85 °C
MAF8051AH–2	microcontroller; 128x8 RAM; 4Kx8 ROM; 3.5 to 12 MHz; –40 to +85 °C
MAF8411	microcontroller; 64x8 RAM; 1Kx8 ROM plus 8–bit LED driver; I^2C bus; 1.0 to 6 MHz; –40 to +85 °C
MAF8421	microcontroller; 64x8 RAM; 2Kx8 ROM plus 8–bit LED driver; 20 I/O lines; I^2C bus; 1.0 to 6 MHz; –40 to +85 °C
MAF8422	microcontroller; 64x8 RAM; 2Kx8 ROM plus 8–bit LED driver; 15 I/O lines; I^2C bus; 1.0 to 6 MHz; –40 to +85 °C

MICROCONTROLLERS (cont.)

NMOS 8–bit (cont.)

MAF8441	microcontroller; 128x8 RAM; 4Kx8 ROM plus 8–bit LED driver; 20 I/O lines; I^{2}C bus; 1.0 to 6 MHz; –40 to +85 °C
MAF8442	microcontroller; 128x8 RAM; 4Kx8 ROM plus 8–bit LED driver; 15 I/O lines; I^{2}C bus; 1.0 to 6 MHz; –40 to +85 °C
MAF8461	microcontroller; 128x8 RAM; 6Kx8 ROM plus 8–bit LED driver; I^{2}C bus; 1.0 to 6 MHz; –40 to +85 °C

POWER SUPPLY ICs

SMPS controllers

TDA8380	SMPS controller
TEA1039	SMPS controller

PPS controllers

TDA2582	control circuit for PPS

RECORDER ICs

SAA4700	video recorder VPS dataline processor
SAA5235	dataline slicer for video cassette recorders
SAA5236	dataline slicer
SAD1009	universal DAC (UDAC)
SAF1135	dataline decoder
TDA2515	dual FM modulator/demodulator for FM audio in VHS video recorders
TDA3724	SECAM identification circuit for video recorders
TDA3725	SECAM (L) chrominance signal processor for video recorders
TDA3730	frequency demodulator and drop–out compensator for video recorders
TDA3740	video processor/frequency modulator for video recorders
TDA3755	PAL/NTSC sync processor for video recorders (VHS system)
TDA3760	PAL chrominance signal processor for video recorders (VHS system)
TDA3765	NTSC chrominance signal processor for video recorders (VHS system)
TDA3766	PAL/NTSC chrominance signal processor for video recorders (VHS system)
TDA3771	video processor for video recorders
TDA3780	frequency modulator for video recorders
TDA3791	band selector and window detector
TDA4710H	VHS chrominance combination for video recorders
TDA4720	SECAM identification circuit for video recorders
TDA4730H	VHS chrominance combination for video recorders
TDA4770H	VHS feature circuit for video recorders
TEA2000	PAL/NTSC colour encoder

REMOTE I/O EXPANDERS

PCF8574	remote 8–bit I/O expander; I^{2}C bus
PCF8574A	remote 8–bit I/O expander; I^{2}C bus; different slave address

REMOTE CONTROLLERS

SAA3004	high performance transmitter (455 kHz) for infrared remote control; up to 448 commands
SAA3006	high performance transmitter (RC–5) for infrared remote control; up to 2048 commands
SAA3008	high performance transmitter (38 kHz) for infrared remote control; low voltage
SAA3027	infrared remote control transmitter (RC–5)
SAA3028	high performance transcoder (RC–5) for infrared remote control; I^{2}C bus
SAF1032	receiver/decoder for infrared remote control
SAF1039	transmitter for infrared remote control
TDA3047	high performance receiver for infrared remote control; positive output voltage
TDA3048	high performance receiver for infrared remote control; negative output voltage

SMALL SIGNAL COMBINATION

Black–white TV

TDA4500	small signal combination for B/W TV
TDA4503	small signal combination for B/W TV (improved TDA4500)

Colour TV

TDA4501	small signal combination with sound circuit for colour TV
TDA4502A	small signal combination with video switch for colour TV
TDA4504	small signal combination for multistandard colour TV (positive and negative modulation)
TDA4505E	small signal combination with sound circuit for colour TV
TDA4505M	small signal combination with circuit for electronic tuning, for colour TV
TDA8305	small signal combination for colour TV (improved TDA4505)

SOUND ICs

SAA7272	NICAM decoder (UK)
SAA7273	NICAM decoder extension
TBA120U	sound IF amplifier/demodulator for TV
TDA1013B	4 W audio power amplifier with DC volume control
TDA1015	1 to 4 W audio power amplifier with preamplifier
TDA1015T	0.5 W audio power amplifier with preamplifier
TDA1029	signal–sources switch (4 x two channels)
TDA1512A	12 to 20 W hi–fi audio power amplifier
TDA1514	40 W hi–fi power amplifier for digital audio (e.g. Compact Disc)

SOUND ICs (cont.)

TDA1514A	40 W hi–fi power amplifier for digital audio (e.g. Compact Disc)
TDA1520B	20 W hi–fi audio power amplifier; complete SOAR protection
TDA1521	2x12 W hi–fi stereo audio power amplifier
TDA1521A	2x6 W hi–fi stereo audio power amplifier
TDA1521Q	2x12 W hi–fi stereo audio power amplifier
TDA1524A	stereo tone/volume control circuit
TDA1525	stereo tone/volume control circuit
TDA2543	AM sound IF circuit for French standard
TDA2545A	quasi–split–sound circuit
TDA2546A	quasi–split–sound circuit with 5,5 MHz demodulation
TDA2555	dual FM demodulator for TV sound; 8–stage limiter
TDA2556	quasi–split–sound circuit with dual FM sound demodulators
TDA2557	dual FM demodulator for TV sound; 5–stage limiter
TDA2611A	5 W audio power amplifier
TDA2613	6 W hi–fi audio power amplifier
TDA2795	TV stereo/dual sound identification decoder
TDA3800G	stereo/dual TV sound processor (dynamic selection)
TDA3800GS	stereo/dual TV sound processor (static selection)
TDA3803A	stereo/dual TV sound decoder
TDA3806	multiplex PLL stereo decoder
TDA3808	second audio programme (SAP) signal processor
TDA3810	spatial, stereo and pseudo–stereo sound circuit
TDA3825	single FM TV sound demodulator system with external AF input and mute
TDA3826	single FM TV sound demodulator system with mute and 6 dB AF amplifier
TDA8405	TV and video recorder stereo/dual sound processor; I^{2}C bus
TDA8420	hi–fi stereo audio processor; I^{2}C bus
TDA8421	hi–fi stereo audio processor; I^{2}C bus
TDA8425	hi–fi stereo audio processor; I^{2}C bus

SYNC PROCESSORS

Horizontal

TBA920S	horizontal combination
TDA2593	horizontal combination
TDA2594	horizontal combination with transmitter identification
TDA2595	horizontal combination with transmitter identification and protection circuits

Vertical

TDA2653A	vertical deflection circuit; PIL–S4; 30AX systems and monitors
TDA2655B	vertical deflection circuit; colour and monochrome (90°)
TDA2658	vertical deflection circuit (90°)
TDA3653B	vertical deflection and guard circuit (90°)
TDA3653CQ	vertical deflection and guard circuit (90°)
TDA3654	vertical deflection and guard circuit (110°)
TDA3654Q	vertical deflection and guard circuit (110°)
TDA8432	vertical deflection processor for computer–controlled TV receivers

SYNC PROCESSORS (cont.)

Vertical (cont.)

TDA8433	vertical deflection processor for computer–controlled TV receivers; I^2C bus; BIMOS successor to TDA8432

Horizontal/vertical

SAA9062	digital deflection controller (DDC) option 1 with on–chip ROM/RAM; ROM preprogrammed for 45AX picture tubes; RAM programmable for other picture tubes; 50/60 Hz vertical frequency; 16 kHz line frequency; I^2C bus
SAA9063	digital deflection controller (DDC) option 2 with on–chip ROM/RAM; ROM preprogrammed for 45AX picture tubes; RAM programmable for other picture tubes; 50/60 Hz vertical frequency; 31 kHz line frequency; I^2C bus
SAA9064	digital deflection controller (DDC) option 3 with on–chip ROM/RAM; ROM preprogrammed for 45AX picture tubes; RAM programmable for other picture tubes; 100/120 Hz vertical frequency; 31 kHz line frequency; I^2C bus
TDA2577A	horizontal/vertical synchronization circuit
TDA2578A	horizontal/vertical synchronization circuit
TDA2579A	horizontal/vertical synchronization circuit
TDA3586	horizontal and vertical sync processor
TDA8370	synchronization processor for TV; I^2C bus
TDA8372A	horizontal/vertical synchronization circuit with SMPS comparator

TEXT SYSTEMS

SAA5030	teletext video processor
SAA5045	gearing and address logic array (GALA) for teletext; 525–line system
SAA5230	teletext video processor (successor of SAA5030)
SAA5231	teletext video processor (successor of SAA5030)
SAA5235	dataline slicer for video cassette recorders
SAA5243E	enhanced computer–controlled teletext circuit (CCT); 625–line system; I^2C bus (West European language version)
SAA5243H	enhanced computer–controlled teletext circuit (CCT); 625–line system; I^2C bus (East European language version)
SAA5243K	enhanced computer–controlled teletext circuit (CCT); 625–line system; I^2C bus (Arabic and English version)
SAA5243L	enhanced computer–controlled teletext circuit (CCT); 625–line system; I^2C bus (Arabic and Hebrew version)
SAA5245A	525–lin system enhanced computer–controlled teletext circuit (USECCT); I^2C bus (West European language version)
SAA5246E	single–chip CMOS teletext processor for 625–line system; I^2C bus (West European language version)
SAA5250	interface for data acquisition and control
SAA5350	EUROM, CRT controller (CEPT standard)
SAA5351	EUROM 50 Hz, CRT controller

TEXT SYSTEMS (cont.)

SAA5355	FTFROM, CRT controller (525–line)
SAA5361	EUROM 60 Hz, CRT controller
SAA9041A	digital video teletext (DVTB) processor for Philips digital TV system (525 and 625–line systems); I^{2}C bus (West European language version)
SAA9068	picture–in–picture controller (PIPCO); I^{2}C bus
SAA9069	digital vertical filter (DVF)

TUNING CIRCUITS

SAA1057	radio tuning PLL frequency synthesizer (SYMO II)
SAA1300	tuner switching circuit; I^{2}C bus
SAB3035	computer interface for tuning and control (CITAC); 8 DACs; I^{2}C bus
SAB3036	computer interface for tuning and control (CITAC); without DACs; I^{2}C bus
SAB3037	computer interface for tuning and control (CITAC); 4 DACs; I^{2}C bus
SAB6456	sensitive 1 GHz divide–by–64/divide–by–256 switchable prescaler
SAB8726	2.6 GHz divide–by–2 prescaler
TDA5030A	mixer/oscillator for VHF tuner
TDA5230	VHF, UHF & hyperband mixer/oscillator for TV 4–band tuners
TDA5330	VHF, UHF & hyperband mixer/oscillator for TV and VCR 3–band tuners
TSA5510	1.3 GHz PLL frequency synthesizer

VIDEO/AUDIO SWITCH

TDA8440	video/audio switch for CTV receivers; I^{2}C bus
TDA8443	I^{2}C bus–controlled YUV/RGB interface circuit
TDA8443A	I^{2}C bus–controlled YUV/RGB interface circuit
TDA9045	video processor and input selector

VIDEO GAMES

SAA1099	stereo sound generator for sound effects and music synthesis (uC–controlled)
TDA6800	video modulator circuit

VISION IF ICs

TDA2549	IF amplifier and demodulator for multistandard TV receivers
TDA8340	TV IF amplifier and demodulator
TDA8340Q	TV IF amplifier and demodulator
TDA8341	TV IF amplifier and demodulator
TDA8341Q	TV IF amplifier and demodulator

PLD

ADDRESS DECODERS

PLS163A	field programmable address decoder (FPAD) (12x9)

LOGIC ARRAYS

PLC16V8	erasable and one–time–programmable logic array (16x72x8)
PLC20V8	erasable and one–time–programmable logic array (20x72x8)
PLC153	erasable and one–time–programmable logic array (18x42x10)
PLC473	erasable–programmable logic array (EPLA) (20x24x11)
PLHS16L8	field–programmable AND array logic (16x64x8)
PLHS18P8	field–programmable AND array logic (18x72x8)
PLHS153	field programmable logic array (FPLA) (18x42x10)
PLHS473	field programmable logic array (FPLA) (20x24x11)
PLS100	field programmable logic array (FPLA) (16x48x8)
PLS101	field programmable logic array (FPLA) (16x48x8)
PLS153	field programmable logic array (FPLA) (18x42x10)
PLS153A	field programmable logic array (FPLA) (18x42x10)
PLS173	field programmable logic array (FPLA) (22x42x10)
PLUS153	field programmable logic array (FPLA) (18x42x10)
PLUS173	field programmable logic array (FPLA) (22x42x10)

LOGIC SEQUENCERS

PLS105	field programmable logic sequencer (FPLS) (16x48x8)
PLS105A	field programmable logic sequencer (FPLS) (16x48x8)
PLS155	field programmable logic sequencer (FPLS) (16x45x12) 4–bit register
PLS155A	field programmable logic sequencer (FPLS) (16x45x12) 4–bit register
PLS157	field programmable logic sequencer (FPLS) (16x45x12) 6–bit register
PLS159A	field programmable logic sequencer (FPLS) (16x45x12) 8–bit register
PLS167	field programmable logic sequencer (FPLS) (14x48x6)
PLS167A	field programmable logic sequencer (FPLS) (14x48x6); enhanced speed
PLS168	field programmable logic sequencer (FPLS) (12x48x8)
PLS168A	field programmable logic sequencer (FPLS) (12x48x8); enhanced speed
PLS179	field programmable logic sequencer (FLPS) (20x45x12)
PLUS405	field programmable logic sequencer (FPLS) (16x64x8)

PLD (cont.)

MACRO LOGIC

PLHS501	field programmable macro logic random logic unit (PML–52) (32x72x24)
PLHS502	field programmable macro sync/async register macro unit (PML–52) (20x24x11)

CMOS SystemGate

Family name	SystemGate
Technology	2 μ, Si–gate CMOS
Programmable layers	M1, M2
Supply voltage	2 to 6.0 V
Ambient temperature range	
Standard (PCF family)	−40 to +85°C
Extended (PCC family)	−55 to +125°C
Typical gate delay	
V_{DD} = 5 V: FO = 2; 2 mm wire	1.5 ns
I/O interface	CMOS, TTL

Family types	PCF0800 PCC0800	PCF1500 PCC1500	PCF2400 PCC2400
Gate count	832	1513	2380
Bonding pads	52	68	88
I/Os	44	60	80
Package types			
DIL	14, 16, 18, 20, 24, 28, 40	24, 28, 40,	24, 28, 40
SO	16L, 20, 24, 28	24, 28	
PLCC	44	44, 68	44, 68, 84
QFP	64	64, 80	64, 80
PGA			84, 120

CAE tools	Mentor, Valid, Daisy, PPDS[1], VAX[2]
Cells in the library	
Peripheral	53
Core	115
Soft Macros	50 (TTL series)
Library	Subset of SystemCell library
Support	
Design Centres	Hamburg, Paris, London, Stockholm, Taipei, Fontenay aux Roses
Technical Support Centres	Stuttgart, Zurich, Vienna, Milan, Barcelona, Eindhoven, Brussels

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1) Philips Personal Design Station (based on IBM PC + graphic editor)
2) Mainframe

CMOS SystemGate II

Family name	SystemGate II
Technology	1.5 μ, Si–gate CMOS
Programmable layers	M1, M2
Supply voltage	3 to 5.5 V
Ambient temperature range	−40 to +85°C
Typical gate delay V_{DD} = 5 V: FO = 2; 2 mm wire	0.7 ns
I/O interface	CMOS, TTL

Family types	PCF3016	PCF3025	PCF3035	PCF3046	PCF3064	PCF3090	PCF3127
Gate count	1638	2478	3480	4628	6351	8976	12714
Bonding pads	64	80	96	116	140	172	204
I/Os	56	72	88	108	132	164	196
Package types							
DIL	20, 24, 28, 40	24, 28, 40,	24, 28, 40	24, 28, 40	40		
SO	24, 28	28					
PLCC	44, 68	44, 68, 84	44, 68, 84	44, 68, 84	44, 68, 84	44, 68, 84	44
QFP	64, 80	64, 80	64, 80	64, 80, 100	64, 80, 100, 120	120, 160	120, 160
PGA		120	84, 120	84, 120	68, 84, 120, 144	68, 84, 120, 144	144

CAE tools	Mentor, Valid, Daisy, PPDS[1)], VAX[2)]
Cells in the library	
Peripheral	
Core	See library manual
Soft Macros	
Library	Compatible with SystemGate library
Support	
Design Centres	Hamburg, Paris, London, Stockholm, Taipei, Fontenay aux Roses
Technical Support centres	Stuttgart, Zurich, Vienna, Milan, Barcelona, Eindhoven, Brussels

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1) Philips Personal Design Station (based on IBM PC + graphic editor)
2) Mainframe

CMOS Sea of Gates

Family name	Sea of Gates
Technology	1,5 µ, Si–gate CMOS
Programmable layers	M1, M2
Supply voltage	3 to 5.5 V
Ambient temperature range	−40 to +85°C
Typical gate delay V_{DD} = 5 V: FO = 2; balanced drive	0.56 ns
I/O interface	CMOS, TTL

Family types	PGT200–						
	003	006	010	017	024	029	
Raw gates	3200	6728	10952	17672	24200	28800	
Used gates	960	2018	3286	5302	7260	8640	
Bonding pads	56	76	96	120	136	148	
I/Os	48	68	88	112	128	140	

Family types	PGT200–						
	033	042	056	073	109	145	180
Raw gates	33800	42632	52488	73728	109512	145000	180000
Used gates	10140	12790	15746	22118	32854	43500	54000
Bonding pads	160	180	204	232	280	320	356
I/Os	152	172	196	224	272	312	348

Package types	
DIL	20 – 40
SO	24, 28
PLCC	44 – 84
QFP	64 – 160
PGA	84 – 144

CMOS Sea of Gates (cont.)

CAE tools	Mentor, VLSI
Cells in the library	See library manual
Library	Compatible with SystemGate II library and VLSI VGT200* library
Support	
Design Centres	Hamburg, Paris, London, Stockholm, Taipei, Fontenay aux Roses
Technical Support centres	Stuttgart, Zurich, Vienna, Milan, Barcelona, Eindhoven, Brussels

The PGT200 family is an exact alternative to VLSI's VGT200* family

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* Registered trade mark of VLSI Technology Inc.

CMOS SystemCell II

Family name	SystemCell II
Technology	1.5 μ, Si–gate CMOS
Programmable layers	M1, M2
Supply voltage	3 to 5.5 V
Ambient temperature range (PCF family)	−40 to +85°C
Typical gate delay	
V_{DD} = 5 V: FO = 2; 2 mm wire	0.7 ns
I/O interface	CMOS, TTL
Range	20K gate–equivalents
Package types	
DIL	14, 16, 18, 20, 24, 28, 40
SO	14, 16, 16L, 20, 24, 28
PLCC	44, 68, 84
QPF	64, 80, 100, 120, 144
PGA	68, 84, 120, 144
CAE tools	Mentor, Valid, Daisy, PPDS1), VAX2)
Cells in the library	
Peripheral	
Core	See library manual
Soft Macros	
Complex	
Analog	
Library	Compatible with SystemGate II and SystemCell
Support	
Design Centres	Hamburg, Paris, London, Stockholm, Taipei, Fontenay aux Roses
Technical Support Centres	Stuttgart, Zurich, Vienna, Milan, Barcelona, Eindhoven, Brussels
Second source	ES2

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1) Philips Personal Design Station (based on IBM PC + graphic editor)
2) Mainframe

Alphanumeric Index

In the alphanumeric index six columns are given (see next page). The first column shows the full (extended) IC type numbers in alpha–numeric sequence. The second, third and fourth columns give package information; the fifth column is a reference to the catalogue page number where the functional placing, the basic type number and brief description of the IC are given. The sixth column refers to the relevant Handbook (IC.., see list below) in which the IC data is published. Where the data is available only on loose data sheet or if handbook data has been superseded by a loose data sheet, this column shows 'DS'; a hyphen (–) indicates that **NO** data are available at date of printing this publication.

code	handbook title
IC01	Radio, audio and associated systems Bipolar, MOS
IC02a/b	Video and associated systems Bipolar, MOS
IC03	ICs for Telecom Bipolar, MOS Subscriber sets, Cordless telephones
IC04	HE4000B logic family CMOS
IC05	HE4000B logic family – uncased ICs CMOS
IC06	High–speed CMOS; PC74HC/HCT/HCU Logic family
IC07	not yet issued
IC08	ECL 10K and 100K logic families
IC09N	TTL logic series
IC10	Memories MOS, TTL, ECL
IC11	Linear products
Supplement to IC11	Linear products
IC12	I^{2}C–bus compatible ICs
IC13	Semi–custom Programmable Logic Devices (PLD)
IC14	Microcontrollers and peripherals Bipolar, MOS
IC15	FAST TTL logic series
IC16	CMOS integrated circuits for clocks and watches
IC17	ICs for Telecom Bipolar, MOS Radio pagers, Mobile telephones, ISDN
IC18	Microprocessors and peripherals
IC19	Data communication products

PACKAGE INFORMATION

The alphanumeric index provides package information in three columns: package code; number of pins, and pin position (an indication of the pin configuration). Brief descriptions of the packages are given in the following table, some packages may have internal heat spreaders.

package code	description	pin position
SOT18/13	3–lead cylindrical; metal (TO18)	CYL
SOT18/17	4–lead cylindrical; metal (TO72)	CYL
SOT20	4–lead single in–line; plastic	SIL
SOT27	14–lead dual in–line; plastic	DIL
SOT32	3 lead single in–line (TO126)	SIL
SOT38;A;D;WE.2;Z	16–lead dual in–line; plastic	DIL
SOT38BE;WBE	16–lead dual in–line; plastic (opposite bent leads)	DIL
SOT58	16–lead quadruple in–line; plastic	QIL
SOT73	14–lead dual in–line; ceramic (CERDIP)	DIL
SOT74;B	16–lead dual in–line; ceramic (CERDIP)	DIL
SOT87B	28–lead dual in–line; metal ceramic (CERDIL)	DIL
SOT94	24–lead dual in–line; ceramic (CERDIP)	DIL
SOT96A;C	8–lead mini–pack; plastic (SO8)	SO8
SOT97A	8–lead dual in–line; plastic	DIL
SOT101A;B	24–lead dual in–line; plastic	DIL
SOT102;H;K;M	18–lead dual in–line; plastic	DIL
SOT102G;GE	18–lead dual in–line; plastic; shortened leads	DIL
SOT108A	14–lead mini–pack; plastic (SO14)	SO14
SOT109A	16–lead mini–pack; plastic (SO16)	SO16
SOT110;B	9–lead single in–line; plastic	SIL
SOT116	22–lead dual in–line; plastic	DIL
SOT117	28–lead dual in–line; plastic	DIL
SOT129	40–lead dual in–line; plastic	DIL
SOT131;A;B	9–lead single in–line; plastic power	SIL
SOT133;B	18–lead dual in–line; ceramic (CERDIP)	DIL
SOT135A	28–lead dual in–line; ceramic (CERDIP)	DIL
SOT136A	28–lead mini–pack; plastic (SO28)	SO28
SOT137;A	24–lead mini–pack; plastic (SO24)	SO24
SOT141B;C;CEA	13–lead SIL–bent–to–DIL; plastic power	SBD
SOT142	9–lead single in–line; plastic	SIL
SOT144	8–lead micro–flat–pack; plastic	MFP
SOT146;A;E;EE7	20–lead dual in–line; plastic	DIL
SOT150	12–lead dual in–line; plastic with metal cooling fin	DIL
SOT157	9–lead SIL–bent–to–DIL; plastic power	SBD
SOT158A	40–lead mini–pack; plastic (VSO40)	VSO40
SOT158B	40–lead mini–pack; plastic (opposite bent leads) (VSO40)	VS040
SOT162;A	16–lead mini–pack; plastic (SO16L)	SO16L
SOT163;A	20–lead mini–pack; plastic (SO20)	SO20
SOT176	8–lead mini–pack; plastic (SO–8L)	SO8L
SOT187	44–lead plastic leaded chip carrier; 'pedestal' version	PLCC
SOT187AA	44–lead plastic leaded chip carrier; 'pocket' version	PLCC
SOT188	68–lead plastic leaded chip carrier; 'pedestal' version	PLCC
SOT188AA	68–lead plastic leaded chip carrier; 'pocket' version	PLCC
SOT189	84–lead plastic leaded chip carrier; 'pedestal' version	PLCC
SOT189AA	84–lead plastic leaded chip carrier; 'pocket' version	PLCC
SOT190	56–lead mini–pack; plastic (VSO56)	VSO56
SOT196A	48–lead quad flat–pack; plastic	QFP
SOT201	32–lead dual in–line; plastic	DIL
SOT205A	44–lead quad flat–pack; plastic	QFP

package code	description	pin position
SOT208	64–lead quad flat–pack; plastic	QFP
SOT213	28–lead mini–pack; plastic (SO28, extra large)	SO28XLG
SOT215	40–lead dual in–line piggy–back; plastic	PB
SOT219	80–lead quad flat–pack; plastic	QFP
SOT220	120–lead quad flat–pack; plastic	QFP
SOT224	22–lead skinny dual in–line; plastic	DIL
SOT239	24–lead mini–pack; plastic (J–bent leads)	SOJ24
FO75	64–pin grid array package without heatsink	PGA
FO99	64–pin grid array package with heatsink	PGA
FO108	144–pin grid array package without heatsink	PGA
FO128	144–pin grid array package with heatsink	PGA
A	plastic leaded chip carrier	PLCC
EC	metal can	TO46/7
D	plastic mini–pack (SO)	SOxx
FA	dual in–line; ceramic (CERDIP) with quartz window	DIL
F;FE	dual in–line; ceramic (CERDIP)	DIL
H	metal can	HEADER
I	dual in–line; metal ceramic (hermetic)(CERDIL)	DIL
N	dual in–line; plastic	DIL
Y	ceramic flat–pack	HLCC/W
–	chip–on–film frame carrier	FFC
–	tape–automatic bonding	TAB
–	28–lead "Piggy–back" with 28–lead EPROM on top	PB
Other abbreviations:		
PADS	connecting surfaces on uncased ICs	
PC–board	printed circuit board	
UW	unsawn wafer	

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ADC0801–1F	F	20	CERDIP	80	IC11
ADC0801–1LCF	F	20	CERDIP	80	IC11
ADC0801–1LCN	N	20	PLDIL	80	IC11
ADC0802–1F	F	20	CERDIP	80	IC11
ADC0802–1LCF	F	20	CERDIP	80	IC11
ADC0802–1LCN	N	20	PLDIL	80	IC11
ADC0803–1CD	D	20	SO20	80	IC11
ADC0803–1LCD	D	20	SO	80	IC11
ADC0803–1LCF	FL	20	CERDIP	80	IC11
ADC0803–1LCN	FL	20	CERDIP	80	IC11
ADC0804–1CD	D	20	SO	80	IC11
ADC0804–1CN	N	20	PLDIL	80	IC11
ADC0804–1LCD	D	20	SO	80	IC11
ADC0804–1LCN	N	20	PLDIL	80	IC11
ADC0805–1LCN	N	20	PLDIL	80	IC11
ADC0820BNED	D	20	SO	80	IC11
ADC0820BNEN	N	20	PLDIL	80	IC11
ADC0820BSAD	D	20	SO	80	IC11
ADC0820BSAN	N	20	PLDIL	80	IC11
ADC0820BSEF	F	20	CERDIP	80	IC11
ADC0820CNED	DL	20	SO	80	IC11
ADC0820CNEN	NL	20	PLDIL	80	IC11
ADC0820CSAD	D	20	SO	80	IC11
ADC0820CSAN	N	20	PLDIL	80	IC11
ADC0820CSEF	F	20	CERDIP	80	IC11
AM26LS31CD	D	16	SO16	91	IC19
AM26LS31CN	N	16	PLDIL	91	IC19
AM26LS31ID	D	16	SO16	91	IC19
AM26LS31IN	N	16	PLDIL	91	IC19
AM26LS31MF	F	16	CERDIP	91	IC19
AM26LS31MN	N	16	PLDIL	91	IC19
AM6012D	DL	20	SO20	80	–
AM6012F	FL	20	CERDIP	80	IC11
CA3089N	N	16	PLDIP	93;103;110	IC11
DAC08AF	F	16	CERDIP	80	IC11
DAC08CF	F	16	CERDIP	80	IC11
DAC08CN	N	16	PLDIL	80	IC11
DAC08ED	D	16	SO	80	IC11
DAC08EF	F	16	CERDIP	80	IC11
DAC08EN	N	16	PLDIL	80	IC11
DAC08F	F	16	CERDIP	80	IC11
DAC08HF	F	16	CERDIP	80	IC11
DAC08HN	N	16	PLDIL	80	IC11
FCB61C61–35J	SOT239	24	SOJ24	66;108;119	DS
FCB61C61–35P	SOT224	22	DIL	66;108;119	DS
FCB61C61–45J	SOT239	24	SOJ24	66;108;119	DS
FCB61C61–45P	SOT224	22	DIL	66;108;119	DS
FCB61C61–55J	SOT239	24	SOJ24	66;108;119	DS
FCB61C61–55P	SOT224	22	DIL	66;108;119	DS
FCB61C61L–35J	SOT239	24	SOJ24	66;108;119	DS
FCB61C61L–35P	SOT224	22	DIL	66;108;119	DS
FCB61C61L–45J	SOT239	24	SOJ24	66;108;119	DS
FCB61C61L–45P	SOT224	22	DIL	66;108;119	DS
FCB61C61L–55J	SOT239	24	SOJ24	66;108;119	DS
FCB61C61L–55P	SOT224	22	DIL	66;108;119	DS
FCB61C62–35J	SOT239	24	SOJ24	66;109;119	DS
FCB61C62–35P	SOT224	22	DIL	66;109;119	DS

extended type no.	package code	no. of pins	pin position	catalogue page no.	handbook
FCB61C62–45J	SOT239	24	SOJ24	66;109;119	DS
FCB61C62–45P	SOT224	22	DIL	66;109;119	DS
FCB61C62–55J	SOT239	24	SOJ24	66;109;119	DS
FCB61C62–55P	SOT224	22	DIL	66;109;119	DS
FCB61C62L–35J	SOT239	24	SOJ24	66;109;119	DS
FCB61C62L–35P	SOT224	22	DIL	66;109;119	DS
FCB61C62L–45J	SOT239	24	SOJ24	66;109;119	DS
FCB61C62L–45P	SOT224	22	DIL	66;109;119	DS
FCB61C62L–55J	SOT239	24	SOJ24	66;109;119	DS
FCB61C62L–55P	SOT224	22	DIL	66;109;119	DS
FCB61C65–45P	SOT117	28	DIL	66;100;109;119	DS
FCB61C65–45T	SOT213	28	SOXL28	66;100;109;119	DS
FCB61C65–55P	SOT117	28	DIL	66;100;109;119	DS
FCB61C65–55T	SOT213	28	SOXL28	66;100;109;119	DS
FCB61C65–70P	SOT117	28	DIL	66;100;109;119	DS
FCB61C65–70T	SOT213	28	SOXL28	66;100;109;119	DS
FCB61C65L–45P	SOT117	28	DIL	66;100;109;119	DS
FCB61C65L–45T	SOT213	28	SOXL28	66;100;109;119	DS
FCB61C65L–55P	SOT117	28	DIL	66;100;109;119	DS
FCB61C65L–55T	SOT213	28	SOXL28	66;100;109;119	DS
FCB61C65L–70P	SOT117	28	DIL	66;100;109;119	DS
FCB61C65L–70T	SOT213	28	SOXL28	66;100;109;119	DS
HEC4001BDB	SOT73	14	DIL	12	IC04
HEC4002BDB	SOT73	14	DIL	12	IC04
HEC4007UBDB	SOT73	14	DIL	10;13	IC04
HEC40097BDB	SOT74	16	DIL	10	IC04
HEC40098BDB	SOT74	16	DIL	10	IC04
HEC4011BDB	SOT73	14	DIL	12	IC04
HEC4012BDB	SOT73	14	DIL	12	IC04
HEC4013BDB	SOT73	14	DIL	11	IC04
HEC4014BDB	SOT74	16	DIL	14	IC04
HEC4015BDB	SOT74	16	DIL	14	IC04
HEC4016BDB	SOT73	14	DIL	14	IC04
HEC4017BDB	SOT74	16	DIL	10	IC04
HEC40174BDB	SOT74	16	DIL	11	IC04
HEC40175BDB	SOT74	16	DIL	11	IC04
HEC4019BDB	SOT74	16	DIL	13	IC04
HEC40194BDB	SOT74	16	DIL	14	IC04
HEC40195BDB	SOT74	16	DIL	14	IC04
HEC4020BDB	SOT74	16	DIL	10	IC04
HEC4023BDB	SOT73	14	DIL	12	IC04
HEC4024BDB	SOT73	14	DIL	10	IC04
HEC4025BDB	SOT73	14	DIL	12	IC04
HEC4027BDB	SOT74	16	DIL	11	IC04
HEC4030BDB	SOT73	14	DIL	12	IC04
HEC4035BDB	SOT74	16	DIL	14	IC04
HEC4040BDB	SOT74	16	DIL	10	IC04
HEC4042BDB	SOT74	16	DIL	13	IC04
HEC4047BDB	SOT73	14	DIL	13	IC04
HEC4049BDB	SOT74	16	DIL	10	IC04
HEC4050BDB	SOT74	16	DIL	10	IC04
HEC4051BDB	SOT74	16	DIL	11;13	IC04
HEC4066BDB	SOT73	14	DIL	14	IC04
HEC4068BDB	SOT73	14	DIL	12	IC04
HEC4069UBDB	SOT73	14	DIL	13	IC04
HEC4070BDB	SOT73	14	DIL	12	IC04
HEC4071BDB	SOT73	14	DIL	12	IC04

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HEC4073BDB	SOT73	14	DIL	11	IC04
HEC4081BDB	SOT73	14	DIL	11	IC04
HEC4093BDB	SOT73	14	DIL	14	IC04
HEC4094BDB	SOT74	16	DIL	14	IC04
HEC4505BDB	SOT73	14	DIL	13	IC04
HEC4510BDB	SOT74	16	DIL	10	IC04
HEC4511BDB	SOT74	16	DIL	11	IC04
HEC4512BDB	SOT74	16	DIL	13	IC04
HEC4519BDB	SOT74	16	DIL	13	IC04
HEC4520BDB	SOT74	16	DIL	10	IC04
HEC4528BDB	SOT74	16	DIL	13	IC04
HEC4539BDB	SOT74	16	DIL	13	IC04
HEC4541BDB	SOT73	14	DIL	14	IC04
HEC4556BDB	SOT74	16	DIL	11	IC04
HEC4557BDB	SOT74	16	DIL	14	IC04
HEC4585BDB	SOT74	16	DIL	10	IC04
HEC4750VD	SOT135A	28	DIL	14	IC04
HEC4750VDB	SOT135A	28	DIL	14	IC04
HEC4751VD	SOT135A	28	DIL	10	IC04
HEC4751VDB	SOT135A	28	DIL	10	IC04
HEF4000BD	SOT73	14	DIL	12	IC04
HEF4000BP	SOT27	14	DIL	12	IC04
HEF4000BT	SOT108A	14	SO14	12	IC04
HEF4000BU	–	12	PADS	12	IC05
HEF4001BD	SOT73	14	DIL	12	IC04
HEF4001BP	SOT27	14	DIL	12	IC04
HEF4001BT	SOT108A	14	SO14	12	IC04
HEF4001BU	–	14	PADS	12	IC05
HEF4001UBD	SOT73	14	DIL	12	IC04
HEF4001UBP	SOT27	14	DIL	12	IC04
HEF4001UBT	SOT108A	14	SO14	12	IC04
HEF4001UBU	–	14	PADS	12	IC05
HEF4002BD	SOT73	14	DIL	12	IC04
HEF4002BP	SOT27	14	DIL	12	IC04
HEF4002BT	SOT108A	14	SO14	12	IC04
HEF4002BU	–	12	PADS	12	IC05
HEF4006BD	SOT73	14	DIL	14	IC04
HEF4006BP	SOT27	14	DIL	14	IC04
HEF4006BT	SOT108A	14	SO14	14	IC04
HEF4006BU	–	13	PADS	14	IC05
HEF4007UBD	SOT73	14	DIL	10;13	IC04
HEF4007UBP	SOT27	14	DIL	10;13	IC04
HEF4007UBT	SOT108A	14	SO14	10;13	IC04
HEF4007UBU	–	14	PADS	10;13	IC05
HEF4008BD	SOT74	16	DIL	10	IC04
HEF4008BP	SOT38Z	16	DIL	10	IC04
HEF4008BT	SOT109A	16	SO16	10	IC04
HEF4008BU	–	16	PADS	10	IC05
HEF40097BD	SOT74	16	DIL	10	IC04
HEF40097BP	SOT38Z	16	DIL	10	IC04
HEF40097BT	SOT109A	16	SO16	10	IC04
HEF40097BU	–	16	PADS	10	IC05
HEF40098BD	SOT74	16	DIL	10	IC04
HEF40098BP	SOT38Z	16	DIL	10	IC04
HEF40098BT	SOT109A	16	SO16	10	IC04
HEF40098BU	–	16	PADS	10	IC05
HEF40106BD	SOT73	14	DIL	14	IC04

extended type no.	package code	no. of pins	pin position	catalogue page no.	handbook
HEF40106BP	SOT27	14	DIL	14	IC04
HEF40106BT	SOT108A	14	SO14	14	IC04
HEF40106BU	–	14	PADS	14	IC05
HEF4011BD	SOT73	14	DIL	12	IC04
HEF4011BP	SOT27	14	DIL	12	IC04
HEF4011BT	SOT108A	14	SO14	12	IC04
HEF4011BU	–	14	PADS	12	IC05
HEF4011UBD	SOT73	14	DIL	12	IC04
HEF4011UBP	SOT27	14	DIL	12	IC04
HEF4011UBT	SOT108A	14	SO14	12	IC04
HEF4011UBU	–	14	PADS	12	IC05
HEF4012BD	SOT73	14	DIL	12	IC04
HEF4012BP	SOT27	14	DIL	12	IC04
HEF4012BT	SOT108A	14	SO14	12	IC04
HEF4012BU	–	12	PADS	12	IC05
HEF4013BD	SOT73	14	DIL	11	IC04
HEF4013BP	SOT27	14	DIL	11	IC04
HEF4013BT	SOT108A	14	SO14	11	IC04
HEF4013BU	–	14	PADS	11	IC05
HEF4014BD	SOT74	16	DIL	14	IC04
HEF4014BP	SOT38Z	16	DIL	14	IC04
HEF4014BT	SOT109A	16	SO16	14	IC04
HEF4014BU	–	16	PADS	14	IC05
HEF4015BD	SOT74	16	DIL	14	IC04
HEF4015BP	SOT38Z	16	DIL	14	IC04
HEF4015BT	SOT109A	16	SO16	14	IC04
HEF4015BU	–	16	PADS	14	IC05
HEF4016BD	SOT73	14	DIL	14	IC04
HEF4016BP	SOT27	14	DIL	14	IC04
HEF4016BT	SOT108A	14	SO14	14	IC04
HEF4016BU	–	14	PADS	14	IC05
HEF40160BD	SOT74	16	DIL	10	IC04
HEF40160BP	SOT38Z	16	DIL	10	IC04
HEF40160BT	SOT109A	16	SO16	10	IC04
HEF40160BU	–	16	PADS	10	IC05
HEF40161BD	SOT74	16	DIL	10	IC04
HEF40161BP	SOT38Z	16	DIL	10	IC04
HEF40161BT	SOT109A	16	SO16	10	IC04
HEF40161BU	–	16	PADS	10	IC05
HEF40162BD	SOT74	16	DIL	11	IC04
HEF40162BP	SOT38Z	16	DIL	11	IC04
HEF40162BT	SOT109A	16	SO16	11	IC04
HEF40162BU	–	16	PADS	11	IC05
HEF40163BD	SOT74	16	DIL	11	IC04
HEF40163BP	SOT38Z	16	DIL	11	IC04
HEF40163BT	SOT109A	16	SO16	11	IC04
HEF40163BU	–	16	PADS	11	IC05
HEF4017BD	SOT74	16	DIL	10	IC04
HEF4017BP	SOT38Z	16	DIL	10	IC04
HEF4017BT	SOT109A	16	SO16	10	IC04
HEF4017BU	–	16	PADS	10	IC05
HEF40174BD	SOT74	16	DIL	11	IC04
HEF40174BP	SOT38Z	16	DIL	11	IC04
HEF40174BT	SOT109A	16	SO16	11	IC04
HEF40174BU	–	16	PADS	11	IC05
HEF40175BD	SOT74	16	DIL	11	IC04
HEF40175BP	SOT38Z	16	DIL	11	IC04

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HEF40175BT	SOT109A	16	SO16	11	IC04
HEF40175BU	–	16	PADS	11	IC05
HEF4018BD	SOT74	16	DIL	10	IC04
HEF4018BP	SOT38Z	16	DIL	10	IC04
HEF4018BT	SOT109A	16	SO16	10	IC04
HEF4018BU	–	16	PADS	10	IC05
HEF4019BD	SOT74	16	DIL	13	IC04
HEF4019BP	SOT38Z	16	DIL	13	IC04
HEF4019BT	SOT109A	16	SO16	13	IC04
HEF4019BU	–	16	PADS	13	IC05
HEF40192BD	SOT74	16	DIL	11	IC04
HEF40192BP	SOT38Z	16	DIL	11	IC04
HEF40192BT	SOT109A	16	SO16	11	IC04
HEF40192BU	–	16	PADS	11	IC05
HEF40193BD	SOT74	16	DIL	11	IC04
HEF40193BP	SOT38Z	16	DIL	11	IC04
HEF40193BT	SOT109A	16	SO16	11	IC04
HEF40193BU	–	16	PADS	11	IC05
HEF40194BD	SOT74	16	DIL	14	IC04
HEF40194BP	SOT38Z	16	DIL	14	IC04
HEF40194BT	SOT109A	16	SO16	14	IC04
HEF40194BU	–	16	PADS	14	IC05
HEF40195BD	SOT74	16	DIL	14	IC04
HEF40195BP	SOT38Z	16	DIL	14	IC04
HEF40195BT	SOT109A	16	SO16	14	IC04
HEF40195BU	–	16	PADS	14	IC05
HEF4020BD	SOT74	16	DIL	10	IC04
HEF4020BP	SOT38Z	16	DIL	10	IC04
HEF4020BT	SOT109A	16	SO16	10	IC04
HEF4020BU	–	16	PADS	10	IC05
HEF4021BD	SOT74	16	DIL	14	IC04
HEF4021BP	SOT38Z	16	DIL	14	IC04
HEF4021BT	SOT109A	16	SO16	14	IC04
HEF4021BU	–	16	PADS	14	IC05
HEF4022BD	SOT74	16	DIL	10	IC04
HEF4022BP	SOT38Z	16	DIL	10	IC04
HEF4022BT	SOT109A	16	SO16	10	IC04
HEF4022BU	–	14	PADS	10	IC05
HEF4023BD	SOT73	14	DIL	12	IC04
HEF4023BP	SOT27	14	DIL	12	IC04
HEF4023BT	SOT108A	14	SO14	12	IC04
HEF4023BU	–	14	PADS	12	IC05
HEF4024BD	SOT73	14	DIL	10	IC04
HEF4024BP	SOT27	14	DIL	10	IC04
HEF4024BT	SOT108A	14	SO14	10	IC04
HEF4024BU	–	11	PADS	10	IC05
HEF40240BP	SOT146	20	DIL	10	IC04
HEF40240BT	SOT163A	20	SO20	10	IC04
HEF40240BU	–	20	PADS	10	IC05
HEF40244BP	SOT146	20	DIL	10	IC04
HEF40244BT	SOT163A	20	SO20	10	IC04
HEF40244BU	–	20	PADS	10	IC05
HEF40245BP	SOT146	20	DIL	10	IC04
HEF40245BT	SOT163A	20	SO20	10	IC04
HEF40245BU	–	20	PADS	10	IC05
HEF4025BD	SOT73	14	DIL	12	IC04
HEF4025BP	SOT27	14	DIL	12	IC04

extended type no.	package code	no. of pins	pin position	catalogue page no.	handbook
HEF4025BT	SOT108A	14	SO14	12	IC04
HEF4025BU	–	14	PADS	12	IC05
HEF4027BD	SOT74	16	DIL	11	IC04
HEF4027BP	SOT38Z	16	DIL	11	IC04
HEF4027BT	SOT109A	16	SO16	11	IC04
HEF4027BU	–	16	PADS	11	IC05
HEF4028BD	SOT74	16	DIL	11	IC04
HEF4028BP	SOT38Z	16	DIL	11	IC04
HEF4028BT	SOT109A	16	SO16	11	IC04
HEF4028BU	–	16	PADS	11	IC05
HEF4029BD	SOT74	16	DIL	10	IC04
HEF4029BP	SOT38Z	16	DIL	10	IC04
HEF4029BT	SOT109A	16	SO16	10	IC04
HEF4029BU	–	16	PADS	10	IC05
HEF4030BD	SOT73	14	DIL	12	IC04
HEF4030BP	SOT27	14	DIL	12	IC04
HEF4030BT	SOT108A	14	SO14	12	IC04
HEF4030BU	–	14	PADS	12	IC05
HEF4031BD	SOT74	16	DIL	14	IC04
HEF4031BP	SOT38Z	16	DIL	14	IC04
HEF4031BT	SOT109A	16	SO16	14	IC04
HEF4031BU	–	9	PADS	14	IC05
HEF4035BD	SOT74	16	DIL	14	IC04
HEF4035BP	SOT38Z	16	DIL	14	IC04
HEF4035BT	SOT109A	16	SO16	14	IC04
HEF4035BU	–	16	PADS	14	IC05
HEF40373BP	SOT146	20	DIL	13	IC04
HEF40373BT	SOT163A	20	SO20	13	IC04
HEF40373BU	–	20	PADS	13	IC05
HEF40374BP	SOT146	20	DIL	11	IC04
HEF40374BT	SOT163A	20	SO20	11	IC04
HEF40374BU	–	20	PADS	11	IC05
HEF4040BD	SOT74	16	DIL	10	IC04
HEF4040BP	SOT38Z	16	DIL	10	IC04
HEF4040BT	SOT109A	16	SO16	10	IC04
HEF4040BU	–	16	PADS	10	IC05
HEF4041BD	SOT73	14	DIL	10	IC04
HEF4041BP	SOT27	14	DIL	10	IC04
HEF4041BT	SOT108A	14	SO14	10	IC04
HEF4041BU	–	14	PADS	10	IC05
HEF4042BD	SOT74	16	DIL	13	IC04
HEF4042BP	SOT38Z	16	DIL	13	IC04
HEF4042BT	SOT109A	16	SO16	13	IC04
HEF4042BU	–	16	PADS	13	IC05
HEF4043BD	SOT74	16	DIL	13	IC04
HEF4043BP	SOT38Z	16	DIL	13	IC04
HEF4043BT	SOT109A	16	SO16	13	IC04
HEF4043BU	–	15	PADS	13	IC05
HEF4044BD	SOT74	16	DIL	13	IC04
HEF4044BP	SOT38Z	16	DIL	13	IC04
HEF4044BT	SOT109A	16	SO16	13	IC04
HEF4044BU	–	15	PADS	13	IC05
HEF4046BD	SOT74	16	DIL	14	IC04
HEF4046BP	SOT38Z	16	DIL	14	IC04
HEF4046BT	SOT109A	16	SO16	14	IC04
HEF4046BU	–	16	PADS	14	IC05
HEF4047BD	SOT73	14	DIL	13	IC04

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HEF4047BP	SOT27	14	DIL	13	IC04
HEF4047BT	SOT108A	14	SO14	13	IC04
HEF4047BU	–	14	PADS	13	IC05
HEF4049BD	SOT74	16	DIL	10	IC04
HEF4049BP	SOT38Z	16	DIL	10	IC04
HEF4049BT	SOT109A	16	SO16	10	IC04
HEF4049BU	–	14	PADS	10	IC05
HEF4050BD	SOT74	16	DIL	10	IC04
HEF4050BP	SOT38Z	16	DIL	10	IC04
HEF4050BT	SOT109A	16	SO16	10	IC04
HEF4050BU	–	14	PADS	10	IC05
HEF4051BD	SOT74	16	DIL	11;13	IC04
HEF4051BP	SOT38Z	16	DIL	11;13	IC04
HEF4051BT	SOT109A	16	SO16	11;13	IC04
HEF4051BU	–	16	PADS	11;13	IC05
HEF4052BD	SOT74	16	DIL	11;13	IC04
HEF4052BP	SOT38Z	16	DIL	11;13	IC04
HEF4052BT	SOT109A	16	SO16	11;13	IC04
HEF4052BU	–	16	PADS	11;13	IC05
HEF4053BD	SOT74	16	DIL	11;13	IC04
HEF4053BP	SOT38Z	16	DIL	11;13	IC04
HEF4053BT	SOT109A	16	SO16	11;13	IC04
HEF4053BU	–	16	PADS	11;13	IC05
HEF4059BD	SOT94	24	DIL	10	IC04
HEF4059BP	SOT101A	24	DIL	10	IC04
HEF4059BT	SOT137A	24	SO24	10	IC04
HEF4059BU	–	24	PADS	10	IC05
HEF4060BD	SOT74	16	DIL	10	IC04
HEF4060BP	SOT38Z	16	DIL	10	IC04
HEF4060BT	SOT109A	16	SO16	10	IC04
HEF4060BU	–	16	PADS	10	IC05
HEF4066BD	SOT73	14	DIL	14	IC04
HEF4066BP	SOT27	14	DIL	14	IC04
HEF4066BT	SOT108A	14	SO14	14	IC04
HEF4066BU	–	14	PADS	14	IC05
HEF4067BD	SOT94	24	DIL	11;13	IC04
HEF4067BP	SOT101A	24	DIL	11;13	IC04
HEF4067BT	SOT137A	24	SO24	11;13	IC04
HEF4067BU	–	24	PADS	11;13	IC05
HEF4068BD	SOT73	14	DIL	12	IC04
HEF4068BP	SOT27	14	DIL	12	IC04
HEF4068BT	SOT108A	14	SO14	12	IC04
HEF4068BU	–	11	PADS	12	IC05
HEF4069UBD	SOT73	14	DIL	13	IC04
HEF4069UBP	SOT27	14	DIL	13	IC04
HEF4069UBT	SOT108A	14	SO14	13	IC04
HEF4069UBU	–	14	PADS	13	IC05
HEF4070BD	SOT73	14	DIL	12	IC04
HEF4070BP	SOT27	14	DIL	12	IC04
HEF4070BT	SOT108A	14	SO14	12	IC04
HEF4070BU	–	14	PADS	12	IC05
HEF4071BD	SOT73	14	DIL	12	IC04
HEF4071BP	SOT27	14	DIL	12	IC04
HEF4071BT	SOT108A	14	SO14	12	IC04
HEF4071BU	–	14	PADS	12	IC05
HEF4072BD	SOT73	14	DIL	12	IC04
HEF4072BP	SOT27	14	DIL	12	IC04

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HEF4072BT	SOT108A	14	SO14	12	IC04
HEF4072BU	–	12	PADS	12	IC05
HEF4073BD	SOT73	14	DIL	11	IC04
HEF4073BP	SOT27	14	DIL	11	IC04
HEF4073BT	SOT108A	14	SO14	11	IC04
HEF4073BU	–	14	PADS	11	IC05
HEF4075BD	SOT73	14	DIL	12	IC04
HEF4075BP	SOT27	14	DIL	12	IC04
HEF4075BT	SOT108A	14	SO14	12	IC04
HEF4075BU	–	14	PADS	12	IC05
HEF4076BD	SOT74	16	DIL	14	IC04
HEF4076BP	SOT38Z	16	DIL	14	IC04
HEF4076BT	SOT109A	16	SO16	14	IC04
HEF4076BU	–	16	PADS	14	IC05
HEF4077BD	SOT73	14	DIL	12	IC04
HEF4077BP	SOT27	14	DIL	12	IC04
HEF4077BT	SOT108A	14	SO14	12	IC04
HEF4077BU	–	14	PADS	12	IC05
HEF4078BD	SOT73	14	DIL	12	IC04
HEF4078BP	SOT27	14	DIL	12	IC04
HEF4078BT	SOT108A	14	SO14	12	IC04
HEF4078BU	–	11	PADS	12	IC05
HEF4081BD	SOT73	14	DIL	11	IC04
HEF4081BP	SOT27	14	DIL	11	IC04
HEF4081BT	SOT108A	14	SO14	11	IC04
HEF4081BU	–	14	PADS	11	IC05
HEF4082BD	SOT73	14	DIL	12	IC04
HEF4082BP	SOT27	14	DIL	12	IC04
HEF4082BT	SOT108A	14	SO14	12	IC04
HEF4082BU	–	12	PADS	12	IC05
HEF4085BD	SOT73	14	DIL	12	IC04
HEF4085BP	SOT27	14	DIL	12	IC04
HEF4085BT	SOT108A	14	SO14	12	IC04
HEF4085BU	–	14	PADS	12	IC05
HEF4086BD	SOT73	14	DIL	12	IC04
HEF4086BP	SOT27	14	DIL	12	IC04
HEF4086BT	SOT108A	14	SO14	12	IC04
HEF4086BU	–	13	PADS	12	IC05
HEF4093BD	SOT73	14	DIL	14	IC04
HEF4093BP	SOT27	14	DIL	14	IC04
HEF4093BT	SOT108A	14	SO14	14	IC04
HEF4093BU	–	14	PADS	14	IC05
HEF4094BD	SOT74	16	DIL	14	IC04
HEF4094BP	SOT38Z	16	DIL	14	IC04
HEF4094BT	SOT109A	16	SO16	14	IC04
HEF4094BU	–	16	PADS	14	IC05
HEF4104BD	SOT74	16	DIL	14	IC04
HEF4104BP	SOT38Z	16	DIL	14	IC04
HEF4104BT	SOT109A	16	SO16	14	IC04
HEF4104BU	–	16	PADS	14	IC05
HEF4502BD	SOT74	16	DIL	10;13	IC04
HEF4502BP	SOT38Z	16	DIL	10;13	IC04
HEF4502BT	SOT109A	16	SO16	10;13	IC04
HEF4502BU	–	16	PADS	10;13	IC05
HEF4505BD	SOT73	14	DIL	13	IC04
HEF4505BP	SOT27	14	DIL	13	IC04
HEF4505BU	–	14	PADS	13	IC05

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HEF4508BD	SOT94	24	DIL	13	IC04
HEF4508BP	SOT101A	24	DIL	13	IC04
HEF4508BT	SOT137A	24	SO24	13	IC04
HEF4508BU	–	24	PADS	13	IC05
HEF4510BD	SOT74	16	DIL	10	IC04
HEF4510BP	SOT38Z	16	DIL	10	IC04
HEF4510BT	SOT109A	16	SO16	10	IC04
HEF4510BU	–	16	PADS	10	IC05
HEF4511BD	SOT74	16	DIL	11;13	IC04
HEF4511BP	SOT38Z	16	DIL	11;13	IC04
HEF4511BT	SOT109A	16	SO16	11;13	IC04
HEF4511BU	–	16	PADS	11;13	IC05
HEF4512BD	SOT74	16	DIL	13	IC04
HEF4512BP	SOT38Z	16	DIL	13	IC04
HEF4512BT	SOT109A	16	SO16	13	IC04
HEF4512BU	–	16	PADS	13	IC05
HEF4514BD	SOT94	24	DIL	11	IC04
HEF4514BP	SOT101A	24	DIL	11	IC04
HEF4514BT	SOT137A	24	SO24	11	IC04
HEF4514BU	–	24	PADS	11	IC05
HEF4515BD	SOT94	24	DIL	11	IC04
HEF4515BP	SOT101A	24	DIL	11	IC04
HEF4515BT	SOT137A	24	SO24	11	IC04
HEF4515BU	–	24	PADS	11	IC05
HEF4516BD	SOT74	16	DIL	10	IC04
HEF4516BP	SOT38Z	16	DIL	10	IC04
HEF4516BT	SOT109A	16	SO16	10	IC04
HEF4516BU	–	16	PADS	10	IC05
HEF4517BD	SOT74	16	DIL	14	IC04
HEF4517BP	SOT38Z	16	DIL	14	IC04
HEF4517BT	SOT162A	16	SO16L	14	IC04
HEF4517BU	–	16	PADS	14	IC05
HEF4518BD	SOT74	16	DIL	10	IC04
HEF4518BP	SOT38Z	16	DIL	10	IC04
HEF4518BT	SOT109A	16	SO16	10	IC04
HEF4518BU	–	16	PADS	10	IC05
HEF4519BD	SOT74	16	DIL	13	IC04
HEF4519BP	SOT38Z	16	DIL	13	IC04
HEF4519BT	SOT109A	16	SO16	13	IC04
HEF4519BU	–	16	PADS	13	IC05
HEF4520BD	SOT74	16	DIL	10	IC04
HEF4520BP	SOT38Z	16	DIL	10	IC04
HEF4520BT	SOT109A	16	SO16	10	IC04
HEF4520BU	–	16	PADS	10	IC05
HEF4521BD	SOT74	16	DIL	10	IC04
HEF4521BP	SOT38Z	16	DIL	10	IC04
HEF4521BT	SOT109A	16	SO16	10	IC04
HEF4521BU	–	16	PADS	10	IC05
HEF4522BD	SOT74	16	DIL	10	IC04
HEF4522BP	SOT38Z	16	DIL	10	IC04
HEF4522BT	SOT109A	16	SO16	10	IC04
HEF4522BU	–	16	PADS	10	IC05
HEF4526BD	SOT74	16	DIL	10	IC04
HEF4526BP	SOT38Z	16	DIL	10	IC04
HEF4526BT	SOT109A	16	SO16	10	IC04
HEF4526BU	–	16	PADS	10	IC05
HEF4527BD	SOT74	16	DIL	14	IC04

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HEF4527BP	SOT38Z	16	DIL	14	IC04
HEF4527BT	SOT109A	16	SO16	14	IC04
HEF4527BU	–	16	PADS	14	IC05
HEF4528BD	SOT74	16	DIL	13	IC04
HEF4528BP	SOT38Z	16	DIL	13	IC04
HEF4528BT	SOT109A	16	SO16	13	IC04
HEF4528BU	–	16	PADS	13	IC05
HEF4531BD	SOT74	16	DIL	10	IC04
HEF4531BP	SOT38Z	16	DIL	10	IC04
HEF4531BT	SOT109A	16	SO16	10	IC04
HEF4531BU	–	16	PADS	10	IC05
HEF4532BD	SOT74	16	DIL	11	IC04
HEF4532BP	SOT38Z	16	DIL	11	IC04
HEF4532BT	SOT109A	16	SO16	11	IC04
HEF4532BU	–	16	PADS	11	IC05
HEF4534BD	SOT94	24	DIL	10	IC04
HEF4534BP	SOT101A	24	DIL	10	IC04
HEF4534BT	SOT137A	24	SO24	10	IC04
HEF4534BU	–	24	PADS	10	IC05
HEF4538BD	SOT74	16	DIL	13	IC04
HEF4538BP	SOT38Z	16	DIL	13	IC04
HEF4538BT	SOT109A	16	SO16	13	IC04
HEF4538BU	–	16	PADS	13	IC05
HEF4539BD	SOT74	16	DIL	13	IC04
HEF4539BP	SOT38Z	16	DIL	13	IC04
HEF4539BT	SOT109A	16	SO16	13	IC04
HEF4539BU	–	16	PADS	13	IC05
HEF4541BD	SOT73	14	DIL	14	IC04
HEF4541BP	SOT27	14	DIL	14	IC04
HEF4541BT	SOT108A	14	SO14	14	IC04
HEF4541BU	–	12	PADS	14	IC05
HEF4543BD	SOT74	16	DIL	11;13	IC04
HEF4543BP	SOT38Z	16	DIL	11;13	IC04
HEF4543BT	SOT109A	16	SO16	11;13	IC04
HEF4543BU	–	16	PADS	11;13	IC05
HEF4555BD	SOT74	16	DIL	11	IC04
HEF4555BP	SOT38Z	16	DIL	11	IC04
HEF4555BT	SOT109A	16	SO16	11	IC04
HEF4555BU	–	16	PADS	11	IC05
HEF4556BD	SOT74	16	DIL	11	IC04
HEF4556BP	SOT38Z	16	DIL	11	IC04
HEF4556BT	SOT109A	16	SO16	11	IC04
HEF4556BU	–	16	PADS	11	IC05
HEF4557BD	SOT74	16	DIL	14	IC04
HEF4557BP	SOT38Z	16	DIL	14	IC04
HEF4557BT	SOT109A	16	SO16	14	IC04
HEF4557BU	–	16	PADS	14	IC05
HEF4585BD	SOT74	16	DIL	10	IC04
HEF4585BP	SOT38Z	16	DIL	10	IC04
HEF4585BT	SOT109A	16	SO16	10	IC04
HEF4585BU	–	16	PADS	10	IC05
HEF4720BD	SOT74	16	DIL	13	IC04
HEF4720BP	SOT38Z	16	SO16	13	IC04
HEF4720BT	SOT162A	16	SO16L	13	IC04
HEF4720VD	SOT74	16	DIL	13	IC04
HEF4720VP	SOT38Z	16	DIL	13	IC04
HEF4720VT	SOT162A	16	SO16L	13	IC04

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HEF4720VU	–	15	PADS	13	IC05
HEF4724BD	SOT74	16	DIL	13	IC04
HEF4724BP	SOT38Z	16	DIL	13	IC04
HEF4724BT	SOT109A	16	SO16	13	IC04
HEF4724BU	–	16	PADS	13	IC05
HEF4731BD	SOT73	14	DIL	14	IC04
HEF4731BP	SOT27	14	DIL	14	IC04
HEF4731VD	SOT73	14	DIL	14	IC04
HEF4731VP	SOT27	14	DIL	14	IC04
HEF4731VU	–	14	PADS	14	IC05
HEF4737BD	SOT133	18	DIL	10	IC04
HEF4737BP	SOT102	18	DIL	10	IC04
HEF4737VD	SOT133	18	DIL	10	IC04
HEF4737VP	SOT102	18	DIL	10	IC04
HEF4737VU	–	18	PADS	10	IC05
HEF4738VP	SOT129	40	DIL	14	IC04
HEF4750VD	SOT135A	28	DIL	14;97;105	IC04
HEF4750VU	–	28	PADS	14;97;105	IC05
HEF4751VD	SOT135A	28	DIL	10;105	IC04
HEF4751VP	SOT117	28	DIL	10;105	IC04
HEF4751VT	SOT136A	28	SO28	10;105	IC04
HEF4751VU	–	28	PADS	10;105	IC05
HEF4752VD	SOT135A	28	DIL	14	IC04
HEF4752VP	SOT117	28	DIL	14	IC04
HEF4753BD	SOT133	18	DIL	14	IC04
HEF4753BP	SOT102	18	DIL	14	IC04
HEF4753VU	–	18	PADS	14	IC05
HEF4754VD	SOT135A	28	DIL	14	IC04
HEF4754VP	SOT117	28	DIL	14	IC04
HEF4754VT	SOT136A	28	SO28	14	IC04
HEF4754VU	–	28	PADS	14	IC05
HEF4755VD	SOT135A	28	DIL	14	IC04
HEF4755VP	SOT117	28	DIL	14	IC04
HEF4755VT	SOT136A	28	SO28	14	IC04
HEF4755VU	–	28	PADS	14	IC05
ICM7555CD	D	8	SO8	88	IC11
ICM7555CFE	FE	8	CERDIP	88	IC11
ICM7555CN	N	8	PLDIL	88	IC11
ICM7555ID	D	8	SO8	88	IC11
ICM7555IFE	FE	8	CERDIP	88	IC11
ICM7555IN	N	8	PLDIL	88	IC11
ICM7555MFE	FE	8	CERDIP	88	IC11
ICM7555MN	N	8	PLDIL	88	IC11
LF198FE	FE	8	CERDIP	87	IC11
LF198H	HE	8	HEADER	87	IC11
LF298FE	FE	8	CERDIP	87	IC11
LF298H	H	8	HEADER	87	IC11
LF398D	D	14	SO14	87	IC11
LF398FE	FE	8	CERDIP	87	IC11
LF398H	HE	8	HEADER	87	IC11
LF398N	NE	8	PLDIL	87	IC11
LM111FE	FE	8	CERDIP	79	IC11
LM119F	FH	14	CERDIP	79	IC11
LM124F	FH	14	CERDIP	77	IC11
LM124N	NH	14	PLDIL	77	IC11
LM139AF	FH	14	CERDIP	79	IC11
LM139F	FH	14	CERDIP	79	IC11

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LM139N	NH	14	PLDIL	79	–
LM158FE	FE	8	CERDIP	77	IC11
LM158N	N	8	PLDIL	77	IC11
LM1870N	N	20	PLDIL	105	IC11
LM193AFE	FE	8	CERDIP	79	IC11
LM193FE	FE	8	CERDIP	79	IC11
LM193N	NE	8	PLDIL	79	–
LM211D	DE	8	SO8	79	IC11
LM211FE	FE	8	CERDIP	79	IC11
LM211N	NE	8	PLDIL	79	IC11
LM219F	FH	14	CERDIP	79	IC11
LM224D	DH	14	SO14	77	–
LM224F	FH	14	CERDIP	77	IC11
LM224N	NH	14	PLDIL	77	IC11
LM239AN	N	14	PLDIL	79	IC11
LM239F	F	14	CERDIP	79	IC11
LM239N	N	14	PLDIL	79	IC11
LM258FE	FE	8	CERDIP	77	IC11
LM258N	NE	8	PLDIL	77	IC11
LM2901D	DH	14	SO14	79	–
LM2901F	FH	14	CERDIP	79	IC11
LM2901N	NH	14	PLDIL	79	IC11
LM2902D	DH	14	SO14	77	IC11
LM2902N	NH	14	PLDIL	77	IC11
LM2903D	DE	8	SO8	79	–
LM2903FE	FE	8	CERDIP	79	–
LM2903N	NE	8	PLDIL	79	IC11
LM2904D	DE	8	SO	77	IC11
LM2904N	NE	8	PLDIL	77	IC11
LM293AFE	FE	8	CERDIP	79	IC11
LM293AN	NE	8	PLDIL	79	IC11
LM293FE	FE	8	CERDIP	79	IC11
LM293N	NE	8	PLDIL	79	IC11
LM311D	DE	8	SO8	79	IC11
LM311F	FE	8	CERDIP	79	–
LM311FE	FE	8	CERDIP	79	IC11
LM311N	NE	8	PLDIL	79	IC11
LM319D	DH	14	SO14	79	IC11
LM319F	FH	14	CERDIP	79	IC11
LM319N	NH	14	PLDIL	79	IC11
LM324AD	DH	14	SO14	77	IC11
LM324D	DH	14	SO14	77	IC11
LM324F	FH	14	CERDIP	77	IC11
LM324N	NH	14	PLDIL	77	IC11
LM339AF	F	14	CERDIP	79	IC11
LM339AN	NH	14	PLDIL	79	IC11
LM339D	DH	14	SO14	79	IC11
LM339F	FH	14	CERDIP	79	IC11
LM339N	NH	14	PLDIL	79	IC11
LM358D	DE	8	SO8	77	IC11
LM358FE	FE	8	CERDIP	77	IC11
LM358N	NE	8	PLDIL	77	IC11
LM393AFE	FE	8	CERDIP	79	IC11
LM393AN	NE	8	PLDIL	79	IC11
LM393D	DE	8	SO8	79	IC11
LM393FE	FE	8	CERDIP	79	IC11
LM393N	NE	8	PLDIL	79	IC11

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MAB8031AH–2P	SOT129	40	DIL	70;121	–
MAB8031AH–2WP	SOT187AA	44	PLCC	70;121	–
MAB8032AHP	SOT129	40	DIL	70;121	DS
MAB8032AHWP	SOT187AA	44	PLCC	70;121	–
MAB8035HLP	SOT129	40	DIL	70;121	DS
MAB8035HLWP	SOT187AA	44	PLCC	70;121	DS
MAB8039HLP	SOT129	40	DIL	70;121	DS
MAB8039HLWP	SOT187AA	44	PLCC	70;121	DS
MAB8040HLP	SOT129	40	DIL	70;121	DS
MAB8040HLWP	SOT187AA	44	PLCC	70;121	DS
MAB8048HP	SOT129	40	DIL	70;121	DS
MAB8048HWP	SOT187AA	44	PLCC	70;121	DS
MAB8049HP	SOT129	40	DIL	70;121	DS
MAB8049HWP	SOT187AA	40	PLCC	70;121	DS
MAB8050HP	SOT129	40	DIL	70;121	DS
MAB8050HWP	SOT187AA	44	PLCC	70;121	DS
MAB8051AH–2P	SOT129	40	DIL	70;121	–
MAB8051AH–2WP	SOT187AA	44	PLCC	70;121	–
MAB8052AHP	SOT129	40	DIL	70;121	DS
MAB8052AHWP	SOT187AA	44	PLCC	70;121	–
MAB8401B	–	28	PB	70;97;102;115;121	IC12
MAB8401WP	SOT188AA	68	PLCC	70;97;102;115;121	IC12
MAB8411P	SOT117	28	DIL	70;97;102;115;121	IC12
MAB8411T	SOT136A	28	SO28	70;97;102;115;121	IC12
MAB8421P	SOT117	28	DIL	70;97;102;115;121	IC12
MAB8421T	SOT136A	28	SO28	70;97;102;115;121	IC12
MAB8422P	SOT146	20	DIL	70;97;102;116;121	IC12
MAB8441P	SOT117	28	DIL	70;97;102;116;121	IC12
MAB8441T	SOT136A	28	SO28	70;97;102;116;121	IC12
MAB8442P	SOT146	20	DIL	70;97;102;116;121	IC12
MAB8461P	SOT117	28	DIL	70;97;102;116;121	IC12
MAB8461T	SOT136A	28	SO28	70;97;102;116;121	IC12
MAF80A31AH–2P	SOT129	40	DIL	70;121	–
MAF80A31AH–2WP	SOT187AA	44	PLCC	70;121	–
MAF80A32AHP	SOT129	40	DIL	71	DS
MAF80A32AHWP	SOT187AA	44	PLCC	71	–
MAF80A35HLP	SOT129	40	DIL	71;122	DS
MAF80A35HLWP	SOT187AA	44	PLCC	71;122	DS
MAF80A39HLP	SOT129	40	DIL	71;122	DS
MAF80A39HLWP	SOT187AA	44	PLCC	71;122	DS
MAF80A40HLP	SOT129	40	DIL	71;122	DS
MAF80A40HLWP	SOT187AA	44	PLCC	71;122	DS
MAF80A48HP	SOT129	40	DIL	71;122	DS
MAF80A48HWP	SOT187AA	44	PLCC	71;122	DS
MAF80A49HP	SOT129	40	DIL	71;122	DS
MAF80A49HWP	SOT187AA	44	PLCC	71;122	DS
MAF80A50HP	SOT129	40	DIL	71;122	DS
MAF80A50HWP	SOT187AA	44	PLCC	71;122	DS
MAF80A51AH–2P	SOT129	40	DIL	71;122	–
MAF80A51AH–2WP	SOT187AA	44	PLCC	71;122	–
MAF80A52AHP	SOT129	40	DIL	71	DS
MAF80A52AHWP	SOT187AA	44	PLCC	71	–
MAF8031AH–2P	SOT129	40	DIL	71;122	–
MAF8031AH–2WP	SOT187AA	44	PLCC	71;122	–
MAF8032AHP	SOT129	40	DIL	71	DS
MAF8032AHWP	SOT187AA	44	PLCC	71	–
MAF8035HLP	SOT129	40	DIL	71;122	DS

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MAF8035HLWP	SOT187AA	44	PLCC	71;122	DS
MAF8039HLP	SOT129	40	DIL	71;122	DS
MAF8039HLWP	SOT187AA	44	PLCC	71;122	DS
MAF8040HLP	SOT129	40	DIL	71;122	DS
MAF8040HLWP	SOT187AA	44	PLCC	71;122	DS
MAF8048HP	SOT129	40	DIL	71;122	DS
MAF8048HWP	SOT187AA	44	PLCC	71;122	DS
MAF8049HP	SOT129	40	DIL	71;122	DS
MAF8049HWP	SOT187AA	44	PLCC	71;122	DS
MAF8050HP	SOT129	40	DIL	71;122	DS
MAF8050HWP	SOT187AA	44	PLCC	71;122	DS
MAF8051AH–2P	SOT129	40	DIL	71;122	–
MAF8051AH–2WP	SOT187AA	44	PLCC	71;122	–
MAF8052AHP	SOT129	40	DIL	71	DS
MAF8052AHWP	SOT187AA	44	PLCC	71	–
MAF84A11P	SOT117	28	DIL	71;97;102;116;122	IC12
MAF84A21P	SOT117	28	DIL	71;98;102;116;122	IC12
MAF84A22P	SOT146	20	DIL	71;98;102;116;122	IC12
MAF84A41P	SOT117	28	DIL	71;98;102;116;122	IC12
MAF84A42P	SOT146	20	DIL	71;98;102;116;122	IC12
MAF84A61P	SOT117	28	DIL	71;98;102;116;122	IC12
MAF8411P	SOT117	28	DIL	71;98;102;116;122	IC12
MAF8421P	SOT117	28	DIL	72;98;102;116;122	IC12
MAF8422P	SOT146	20	DIL	72;98;102;116;122	IC12
MAF8441P	SOT117	28	DIL	72;98;102;116;123	IC12
MAF8442P	SOT146	20	DIL	72;98;102;116;123	IC12
MAF8461P	SOT117	28	DIL	72;98;102;116;123	IC12
MC1408–7F	F	16	CERDIP	80	IC11
MC1408–7N	NJ	16	PLDIL	80	IC11
MC1408–8D	DJ	16	SO16	80	IC11
MC1408–8F	FJ	16	CERDIP	80	–
MC1408–8N	NJ	16	PLDIL	80	–
MC1458D	DE	8	SO8	77	IC11
MC1458F	FE	8	CERDIP	77	–
MC1458N	NE	8	PLDIL	77	IC11
MC1488D	DH	14	SO14	81;91	IC11 IC19
MC1488F	FH	14	CERDIP	81;91	IC11 IC19
MC1488N	NH	14	PLDIL	81;91	IC11 IC19
MC1489AD	DH	14	SO14	82;91	IC11 IC19
MC1489AF	FH	14	CERDIP	82;91	IC11 IC19
MC1489AN	NH	14	PLDIL	82;91	IC11 IC19
MC1489D	DH	14	SO14	82;91	IC11 IC19
MC1489F	FH	14	CERDIP	82;91	IC11 IC19
MC1489N	NH	14	PLDIL	82;91	IC11 IC19
MC1496F	F	14	CERDIP	93	IC11
MC1496N	NH	14	PLDIL	93	IC11
MC1508–8F	FJ	16	CERDIP	80	IC11
MC1558N	NE	8	PLDIL	77	IC11

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MC1596F	FH	14	CERDIP	93	IC11
MC1596N	NH	14	PLDIL	93	IC11
MC3302D	DH	14	SO14	79	IC11
MC3302F	F	14	CERDIP	79	IC11
MC3302N	NH	14	PLDIL	79	IC11
MC3303F	F	14	CERDIP	77	IC11
MC3303N	NH	14	PLDIL	77	IC11
MC3361D	DJ	16	SO16	93;110;111	IC03 IC11
MC3361N	NJ	16	PLDIL	93;110;111	IC03 IC11
MC3403D	DH	14	SO14	77	IC11
MC3403F	F	14	CERDIP	77	IC11
MC3403N	NH	14	PLDIL	77	IC11
MC3410CF	FJ	16	CERDIP	80	IC11
MC3410F	FJ	16	CERDIP	80	IC11
MC3410N	NJ	16	PLDIL	80	–
MC3503F	FH	14	CERDIP	77	IC11
MC3503N	NH	14	PLDIL	77	–
MC3510	F	16	CERDIP	80;95	IC11
MEB3000	SOT87B	28	CERDIL	83	DS
NE1012D	DE	8	SO8	77	–
NE1012N	NE	8	PLDIL	77	–
NE1037D	DE	8	SO8	77	–
NE1037N	NE	8	PLDIL	77	–
NE4558D	DE	8	SO8	77	IC11
NE4558FE	FE	8	CERDIP	77	IC11
NE4558N	NE	8	PLDIL	77	IC11
NE5018D	DN	24	SO24L	72;74;80	IC11
NE5018F	FM	22	CERDIP	72;74;80	IC11
NE5018N	NM	22	PLDIL	72;74;80	IC11
NE5019F	FM	22	CERDIP	72;74;80	IC11
NE5019N	NM	22	PLDIL	72;74;80	IC11
NE5020F	F	24	CERDIP	72;74;80	IC11
NE5020N	NN	24	PLDIL	72;74;80	IC11
NE5030F	F	24	CERDIP	80	IC11
NE5034F	FK	18	CERDIP	80	IC11
NE5036D	DH	14	SO14	80	IC11
NE5036FE	FE	8	CERDIP	80	IC11
NE5036N	NE	8	PLDIL	80	IC11
NE5037D	DJ	16	SO16	80	IC11
NE5037F	F	16	CERDIP	80	IC11
NE5037N	NJ	16	PLDIL	80	IC11
NE5044D	DJ	16	SO16	84	IC11
NE5044N	NJ	16	PLDIL	84	IC11
NE5045D	DJ	16	SO16	84	IC11
NE5045N	NJ	16	PLDIL	84	IC11
NE5050D	DL	20	SO20L	91	IC11 IC19
NE5050N	N	20	PLDIL	91	IC11 IC19
NE5060F	FH	14	CERDIP	87	IC11
NE5080N	NJ	16	PLDIL	91	IC11 IC19
NE5081N	NL	20	PLDIL	91	IC11 IC19
NE5090D	DJ	16	SO16L	81;83	IC11

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NE5090F	FJ	16	CERDIP	81;83	IC11
NE5090N	NJ	16	PLDIL	81;83	IC11
NE5105AD	D	8	SO8	79	IC11
NE5105AN	N	8	PLDIL	79	IC11
NE5105D	DE	8	SO8	79	IC11
NE5105N	NE	8	PLDIL	79	IC11
NE5118F	F	22	CERDIP	72;74;80	IC11
NE5118N	NM	22	PLDIL	72;74;80	IC11
NE5119F	FM	22	CERDIP	72;74;80	IC11
NE5119N	NM	22	PLDIL	72;74;80	IC11
NE5150F	F	24	CERDIP	80;114	IC11
NE5151F	F	24	CERDIP	80;114	IC11
NE5152F	F	24	CERDIP	80;114	IC11
NE5170A	AQ	28	PLCC	81;91	IC11 IC19
NE5170D	D	24	SO24	81;91	IC11 IC19
NE5170N	N	28	PLDIL	81;91	IC11 IC19
NE5180A	AQ	28	PLCC	82;91	IC11 IC19
NE5180N	N	28	PLDIL	82;91	IC11 IC19
NE5181A	AQ	28	PLCC	82;91	IC11 IC19
NE5181N	N	28	PLDIL	82;91	IC11 IC19
NE5204D	DE	8	SO8	77;91	IC11 IC19
NE5204N	NE	8	PLDIL	77;91	IC11 IC19
NE5205D	DE	8	SO8	77;91	IC11 IC19
NE5205EC	EC	4	T046/7	77;91	IC11 IC19
NE5205FE	FE	8	CERDIP	77;91	IC11 IC19
NE5205N	NE	8	PLDIL	77;91	IC11 IC19
NE521D	DH	14	SO14	79	IC11
NE521F	FH	14	CERDIP	79	IC11
NE521N	NH	14	PLDIL	79	IC11
NE5212D	DE	8	SO8	76;91	IC11 IC19
NE5212FE	FE	8	CERDIP	76;91	IC11 IC19
NE5212N	NE	8	PLDIL	76;91	IC11 IC19
NE522D	DH	14	SO14	79	IC11
NE522F	FH	14	CERDIP	79	IC11
NE522N	NH	14	PLDIL	79	IC11
NE5230D	DE	8	SO8	77;106	IC11 IC03 IC17
NE5230FE	FE	8	CERDIP	77;106	IC11 IC03 IC17

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NE5230N	NE	8	PLDIL	77;106	IC11 IC03 IC17
NE5240D	D	28	SO28	97	IC11
NE5240F	F	28	CERDIP	97	–
NE5240N	N	28	PLDIL	97	IC11
NE527D	DH	14	SO14	79	IC11
NE527F	FH	14	CERDIP	79	IC11
NE527H	HF	10	HEADER	79	IC11
NE527N	NH	14	PLDIL	79	IC11
NE529D	DH	14	SO14	79	IC11
NE529F	FH	14	CERDIP	79	IC11
NE529H	HF	10	HEADER	79	IC11
NE529N	NH	14	PLDIL	79	IC11
NE530FE	FE	8	CERDIP	77	IC11
NE530N	NE	8	PLDIL	77	IC11
NE531FE	FE	8	CERDIL	77	IC11
NE531H	HE	8	HEADER	77	IC11
NE531N	NE	8	PLDIL	77	IC11
NE532D	DE	8	SO8	77	IC11
NE532FE	FE	8	CERDIP	77	IC11
NE532N	NE	8	PLDIL	77	IC11
NE538D	DE	8	SO8	77	–
NE538FE	FE	8	CERDIP	77	IC11
NE538H	HE	8	HEADER	77	IC11
NE538N	NE	8	PLDIL	77	IC11
NE5410F	FJ	16	CERDIP	80	IC11
NE542N	NE	8	PLDIL	76;94;106	IC11
NE544D	DJ	16	SO16L	84	IC11
NE544N	NH	14	PLDIL	84	IC11
NE5512D	DE	8	SO8	77	IC11
NE5512FE	FE	8	CERDIP	77	IC11
NE5512N	NE	8	PLDIL	77	IC11
NE5514D	DJ	16	SO16L	77	IC11
NE5514F	F	14	CERDIP	77	IC11
NE5514N	NH	14	PLDIL	77	IC11
NE5517AN	NJ	16	PLDIL	77	IC11
NE5517D	DJ	16	SO16L	77	IC11
NE5517N	NJ	16	PLDIL	77	IC11
NE5520D	DJ	16	SO16L	85	IC11
NE5520F	F	16	CERDIP	85	IC11
NE5520N	NH	14	PLDIL	85	IC11
NE5521D	DJ	16	SO16	85	IC11
NE5521F	FK	18	CERDIP	85	IC11
NE5521N	NK	18	PLDIL	85	IC11
NE5532AFE	FE	8	CERDIP	77	IC11
NE5532AN	NE	8	PLDIL	77	IC11
NE5532D	D	16	SO16L	77	IC11
NE5532FE	FE	8	CERDIP	77	IC11
NE5532N	NE	8	PLDIL	77	IC11
NE5533AD	D	16	SO16	77	IC11
NE5533AN	NH	14	PLDIL	77	IC11
NE5533D	D	16	SO16	77	IC11
NE5533N	NH	14	PLDIL	77	IC11
NE5534AD	DE	8	SO8	77	IC11
NE5534AFE	FE	8	CERDIP	77	IC11
NE5534AN	NE	8	PLDIL	77	IC11

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NE5534D	DE	8	SO8	77	IC11
NE5534FE	FE	8	CERDIP	77	IC11
NE5534N	NE	8	PLDIL	77	IC11
NE5535F	F	14	CERDIP	77	IC11
NE5535N	NE	8	PLDIL	77	IC11
NE5537D	DH	14	SO14	87	IC11
NE5537FE	FE	8	CERDIP	87	–
NE5537N	NE	8	PLDIL	87	IC11
NE5539D	DH	14	SO14	77;91;113	IC11 IC19
NE5539F	FH	14	CERDIP	77;91;113	IC11 IC19
NE5539N	NH	14	PLDIL	77;91;113	IC11 IC19
NE555D	DE	8	SO8	88	IC11
NE555F	FH	14	CERDIP	88	IC11
NE555FE	FE	8	CERDIP	88	IC11
NE555N	NE	8	PLDIL	88	IC11
NE556–1F	F	14	CERDIP	88	IC11
NE556–1N	NH	14	PLDIL	88	IC11
NE556D	DH	14	SO14	88	IC11
NE556F	FH	14	CERDIP	88	IC11
NE556N	NH	14	PLDIL	88	IC11
NE5560D	DJ	16	SO16	86	IC11
NE5560F	FJ	16	CERDIP	86	IC11
NE5560N	NJ	16	PLDIL	86	IC11
NE5561D	DE	8	SO8	86	IC11
NE5561FE	FE	8	CERDIP	86	IC11
NE5561N	NE	8	PLDIL	86	IC11
NE5562D	DL	20	SO20	86	IC11
NE5562F	FL	20	CERDIP	86	IC11
NE5562N	NL	20	PLDIL	86	IC11
NE5568D	DE	8	SO8	86	IC11
NE5568FE	FE	8	CERDIP	86	IC11
NE5568N	NE	8	PLDIL	86	IC11
NE5570D	DN	24	SO24L	84	IC11
NE5570F	F	24	CERDIP	84	IC11
NE5570N	NN	24	PLDIL	84	IC11
NE558D	DJ	16	SO16L	88	IC11
NE558F	F	16	CERDIP	88	IC11
NE558N	NJ	16	PLDIL	88	IC11
NE5592D	DH	14	SO14	77;113	IC11
NE5592N	NH	14	PLDIL	77;113	IC11
NE564D	DJ	16	SO16	91;93	IC11 IC19
NE564F	FJ	16	CERDIP	91;93	IC11 IC19
NE564I	IJ	16	CERDIL	91;93	–
NE564N	NJ	16	PLDIL	91;93	IC11 IC19
NE565D	DH	14	SO14	93	IC11
NE565F	FH	14	CERDIP	93	IC11
NE565N	NH	14	PLDIL	93	IC11
NE566D	DE	8	SO8	93	IC11
NE566F	FH	14	CERDIP	93	IC11
NE566N	NE	8	PLDIL	93	IC11
NE567D	DE	8	SO8	93;110;111	IC11

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NE567D	DE	8	SO8	93;110;111	IC03
NE567F	FH	14	CERDIP	93;110;111	IC11 IC03
NE567FE	FE	8	CERDIP	93;110;111	IC11
NE567N	NE	8	PLDIL	93;110;111	IC11 IC03
NE568D	D	20	SO20	91;93	IC11 IC19
NE568N	N	20	PLDIL	91;93	IC11 IC19
NE570F	FJ	16	CERDIP	93;110	IC11 IC17
NE570N	NJ	16	PLDIL	93;110	IC11 IC17
NE571D	DJ	16	SO16L	93;110	IC11 IC17
NE571F	FJ	16	CERDIP	93;110	IC11 IC17
NE571N	NJ	16	PLDIL	93;110	IC11 IC17
NE572D	DJ	16	SO16L	93;110	IC11
NE572N	NJ	16	PLDIL	93;110	IC11
NE575D	D	20	SO20	93;110;111	IC11 IC03 IC17
NE575N	N	20	PLDIL	93;110;111	IC11 IC03 IC17
NE587D	DL	20	SO20	72;74;81;83;90	IC11
NE587F	F	18	CERDIP	72;74;81;83;90	IC11
NE587N	NK	18	PLDIL	72;74;81;83;90	IC11
NE589D	DL	20	SO20	72;74;81;83;90	IC11
NE589N	NK	18	PLDIL	72;74;81;83;90	IC11
NE590F	FJ	16	CERDIP	81;83	IC11
NE590N	NJ	16	PLDIL	81;83	IC11
NE5900D	DJ	16	SO16L	106	IC11 IC03
NE5900N	NJ	16	PLDIL	106	IC11 IC03
NE591F	F	18	CERDIP	81	IC11
NE591N	NK	18	PLDIL	81	IC11
NE592D14	DH	14	SO14	77;91;113	IC11 IC19
NE592D8	DE	8	SO8	77;91;113	IC11 IC19
NE592F14	FH	14	CERDIP	77;91;113	IC11 IC19
NE592F8	FE	8	CERDIP	77;91;113	–
NE592H	HF	10	HEADER	77;91;113	IC11 IC19
NE592HD14	DH	14	SO14	77;91;113	IC11 IC19
NE592HD8	DE	8	SO8	77;91;113	IC11 IC19
NE592HN14	NH	14	PLDIL	77;91;113	IC11 IC19
NE592HN8	NE	8	PLDIL	77;91;113	IC11

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NE592HN8	NE	8	PLDIL	77;91:113	IC19
NE592N14	NH	14	PLDIL	77;91;113	IC11 IC19
NE592N8	NE	8	PLDIL	77;91;113	IC11 IC19
NE594D	DL	20	SO20	81;90	IC11
NE594F	F	18	CERDIP	81;90	IC11
NE594N	NK	18	PLDIL	81;90	IC11
NE602D	DE	8	SO8	91;93;110	IC11 IC17 IC19
NE602FE	FE	8	CERDIP	91;93;110	IC11 IC17 IC19
NE602N	NE	8	PLDIL	91;93;110	IC11 IC17 IC19
NE604D	DJ	16	SO16	91;93;110	IC11 IC17 IC19
NE604F	F	16	CERDIP	91;93;110	IC11 IC17 IC19
NE604N	NJ	16	PLDIL	91;93;110	IC11 IC17 IC19
NE605D	D	20	SO20	93;103;110	IC11 IC17
NE605F	F	20	DIL	93;103;110	IC11 IC17
NE605N	N	20	DIL	93;103;110	IC11 IC17
NE612D	DE	8	SO8	93;110	IC11 IC03 IC17
NE612N	NE	8	PLDIL	93;110	IC11 IC03 IC17
NE614D	DJ	16	SO16	93;110	IC11 IC03 IC17
NE614N	NJ	16	PLDIL	93;110	IC11 IC03 IC17
NE645N	NJ	16	PLDIL	97	IC11
NE646N	NJ	16	PLDIL	97	IC11
NE648N	NJ	16	PLDIL	97	IC11
NE649N	NJ	16	PLDIL	97	IC11
NE650N	NK	18	PLDIL	97	IC11
N2960I	IY	48	CERDIL	67	IC09
N2960N	NY	48	PLDIL	67	IC09
N2964BI	IW	40	CERDIL	67;75	IC09
N2964BN	NW	40	PLDIL	67;75	IC09
N3001I	IW	40	CERDIL	63	IC09
N3001N	NW	40	PLDIL	63	IC09
N3002F	FQ	28	CERDIP	63	IC09
N3002N	NQ	28	PLDIL	63	IC09

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N3101AD	D	16	SO16	66	IC10
N3101AN	NJ	16	PLDIL	66	IC10
N74ALS00AD	DH	14	SO14	47	–
N74ALS00AN	NH	14	PLDIL	47	–
N74ALS02D	DH	14	SO14	48	–
N74ALS02N	NH	14	PLDIL	48	–
N74ALS04BD	DH	14	SO14	48	–
N74ALS04BN	NH	14	PLDIL	48	–
N74ALS08D	DH	14	SO14	47	–
N74ALS08N	NH	14	PLDIL	47	–
N74ALS10AD	DH	14	SO14	47	–
N74ALS10AN	NH	14	PLDIL	47	–
N74ALS109AD	DJ	16	SO16	46	–
N74ALS109AN	NJ	16	PLDIL	46	–
N74ALS11AD	DH	14	SO14	47	–
N74ALS11AN	NH	14	PLDIL	47	–
N74ALS112AD	DJ	16	SO16	46	–
N74ALS112AN	NJ	16	PLDIL	46	–
N74ALS138D	DJ	16	SO16	45	–
N74ALS138N	NJ	16	PLDIL	45	–
N74ALS139D	DJ	16	SO16	45	–
N74ALS139N	NJ	16	PLDIL	45	–
N74ALS151D	DJ	16	SO16	45	–
N74ALS151N	NJ	16	PLDIL	49	–
N74ALS153D	DJ	16	SO16	49	–
N74ALS153N	NJ	16	PLDIL	49	–
N74ALS157D	DJ	16	SO16	49;51	–
N74ALS157N	NJ	16	PLDIL	49;51	–
N74ALS158D	DJ	16	SO16	49;51	–
N74ALS158N	NJ	16	PLDIL	49;51	–
N74ALS161BD	DJ	16	SO16	45	–
N74ALS161BN	NJ	16	PLDIL	45	–
N74ALS163BD	DJ	16	SO16	45	–
N74ALS163BN	NJ	16	PLDIL	45	–
N74ALS164D	DH	14	SO14	50	–
N74ALS164N	NH	14	PLDIL	50	–
N74ALS174D	DJ	16	SO16	46	–
N74ALS174N	NJ	16	PLDIL	46	–
N74ALS175D	DJ	16	SO16	46	–
N74ALS175N	NJ	16	PLDIL	46	–
N74ALS191D	DJ	16	SO16	45	–
N74ALS191N	NJ	16	PLDIL	45	–
N74ALS193D	DJ	16	SO16	45	–
N74ALS193N	NJ	16	PLDIL	45	–
N74ALS20AD	DH	14	SO14	47	–
N74ALS20AN	NH	14	PLDIL	47	–
N74ALS240A–1	–	–	–	43	–
N74ALS240AD	DL	20	SO20	43	–
N74ALS240AN	NL	20	PLDIL	43	–
N74ALS241A–1	–	–	–	43	–
N74ALS241AD	DL	20	SO20	43	–
N74ALS241AN	NL	20	PLDIL	43	–
N74ALS244A–1	–	–	–	43	–
N74ALS244AD	DL	20	SO20	43	–
N74ALS244AN	NL	20	PLDIL	43	–
N74ALS245A–1	–	–	–	44	–
N74ALS245AD	DL	20	SO20	44	–

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N74ALS245AN	NL	20	PLDIL	44	–
N74ALS251D	DJ	16	SO16	49	–
N74ALS251N	NJ	16	PLDIL	49	–
N74ALS253D	DJ	16	SO16	49	–
N74ALS253N	NJ	16	PLDIL	49	–
N74ALS257D	DJ	16	SO16	49;51	–
N74ALS257N	NJ	16	PLDIL	49;51	–
N74ALS258D	DJ	16	SO16	49;51	–
N74ALS258N	NJ	16	PLDIL	49;51	–
N74ALS27D	DH	14	SO14	48	–
N74ALS27N	NH	14	PLDIL	48	–
N74ALS273D	DL	20	SO20	46	–
N74ALS273N	NL	20	PLDIL	46	–
N74ALS30AD	DH	14	SO14	48	–
N74ALS30AN	NH	14	PLDIL	48	–
N74ALS32D	DH	14	SO14	48	–
N74ALS32N	NH	14	PLDIL	48	–
N74ALS373D	DL	20	SO20	46	–
N74ALS373N	NL	20	PLDIL	46	–
N74ALS374D	DL	20	SO20	46	–
N74ALS374N	NL	20	PLDIL	46	–
N74ALS38AD	DH	14	SO14	48	–
N74ALS38AN	NH	14	PLDIL	48	–
N74ALS563D	DL	20	SO20	46	–
N74ALS563N	NL	20	PLDIL	46	–
N74ALS564D	DL	20	SO20	46	–
N74ALS564N	NL	20	PLDIL	46	–
N74ALS573D	DL	20	SO20	46	–
N74ALS573N	NL	20	PLDIL	46	–
N74ALS574D	DL	20	SO20	46	–
N74ALS574N	NL	20	PLDIL	46	–
N74ALS620A–1	–	–	–	44;52	–
N74ALS620AD	DL	20	SO20	44;52	–
N74ALS620AN	NL	20	PLDIL	44;52	–
N74ALS623A–1	–	–	–	44;52	–
N74ALS623AD	DL	20	SO20	44;52	–
N74ALS623AN	NL	20	PLDIL	44;52	–
N74ALS74AD	DH	14	SO14	46	–
N74ALS74AN	NH	14	PLDIL	46	–
N74ALS86D	DH	14	SO14	47	–
N74ALS86N	NH	14	PLDIL	47	–
N74F00D	DH	14	SO14	47	IC15
N74F00N	NH	14	PLDIL	47	IC15
N74F02D	DH	14	SO14	48	IC15
N74F02N	NH	14	PLDIL	48	IC15
N74F04D	DH	14	SO14	48	IC15
N74F04N	NH	14	PLDIL	48	IC15
N74F08D	DH	14	SO14	47	IC15
N74F08N	NH	14	PLDIL	47	IC15
N74F10D	DH	14	SO14	47	IC15
N74F10N	NH	14	PLDIL	47	IC15
N74F109D	DJ	16	SO16	46	IC15
N74F109N	NJ	16	PLDIL	46	IC15
N74F11D	DH	14	SO14	47	IC15
N74F11N	NH	14	PLDIL	47	IC15
N74F112D	DJ	16	SO16	46	IC15
N74F112N	NJ	16	PLDIL	46	IC15

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N74F113D	DH	14	SO14	46	IC15
N74F113N	NH	14	PLDIL	46	IC15
N74F114D	DH	14	SO14	46	IC15
N74F114N	NH	14	PLDIL	46	IC15
N74F1240D	DL	20	SO20	44	IC15
N74F1240N	NL	20	PLDIL	44	IC15
N74F1241D	DL	20	SO20	44	IC15
N74F1241N	NL	20	PLDIL	44	IC15
N74F1242D	DH	14	SO14	52	IC15
N74F1242N	NH	14	PLDIL	52	IC15
N74F1243D	DH	14	SO14	52	IC15
N74F1243N	NH	14	PLDIL	52	IC15
N74F1244D	DL	20	SO20	44	IC15
N74F1244N	NL	20	PLDIL	44	IC15
N74F1245D	DL	20	SO20	44	IC15
N74F1245N	NL	20	PLDIL	44	IC15
N74F125D	DH	14	SO14	43	IC15
N74F125N	NH	14	PLDIL	43	IC15
N74F126D	DH	14	SO14	43	IC15
N74F126N	NH	14	PLDIL	43	IC15
N74F13D	DH	14	SO14	51	IC15
N74F13N	NH	14	PLDIL	51	IC15
N74F132D	DH	14	SO14	51	IC15
N74F132N	NH	14	PLDIL	51	IC15
N74F133N	NJ	16	PLDIL	48	IC15
N74F138D	DJ	16	SO16	45	IC15
N74F138N	NJ	16	PLDIL	45	IC15
N74F139D	DJ	16	SO16	45	IC15
N74F139N	NJ	16	PLDIL	45	IC15
N74F14D	DH	14	SO14	51	IC15
N74F14N	NH	14	PLDIL	51	IC15
N74F148D	DJ	16	SO16	46	IC15
N74F148N	NJ	16	PLDIL	46	IC15
N74F151AD	DJ	16	SO16	49	IC15
N74F151AN	NJ	16	PLDIL	49	IC15
N74F151D	DJ	16	SO16	49	IC15
N74F151N	NJ	16	PLDIL	49	IC15
N74F153D	DJ	16	SO16	49	IC15
N74F153N	NJ	16	PLDIL	49	IC15
N74F154D	DN	24	SO24	45	IC15
N74F154N	NN	24	PLDIL	45	IC15
N74F157AD	DJ	16	SO16	49;51	IC15
N74F157AN	NJ	16	PLDIL	49;51	IC15
N74F157D	DJ	16	SO16	49;51	IC15
N74F157N	NJ	16	PLDIL	49;51	IC15
N74F158AD	DJ	16	SO16	49;51	IC15
N74F158AN	NJ	16	PLDIL	49;51	IC15
N74F158D	DJ	16	SO16	49;51	IC15
N74F158N	NJ	16	PLDIL	49;51	IC15
N74F160AD	DJ	16	SO16	44	IC15
N74F160AN	NJ	16	PLDIL	44	IC15
N74F161AD	DJ	16	SO16	45	IC15
N74F161AN	NJ	16	PLDIL	45	IC15
N74F162AD	DJ	16	SO16	45	IC15
N74F162AN	NJ	16	PLDIL	45	IC15
N74F163AD	DJ	16	SO16	45	IC15
N74F163AN	NJ	16	PLDIL	45	IC15

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N74F163N	NJ	16	PLDIL	45	IC15
N74F164D	DH	14	SO14	50	IC15
N74F164N	NH	14	PLDIL	50	IC15
N74F165N	NJ	16	PLDIL	50	IC15
N74F166D	DJ	16	SO16	50	IC15
N74F166N	NJ	16	PLDIL	50	IC15
N74F168D	DJ	16	SO16	45	IC15
N74F168N	NJ	16	PLDIL	45	IC15
N74F169D	DJ	16	SO16	45	IC15
N74F169N	NJ	16	PLDIL	45	IC15
N74F173D	DJ	16	SO16	46	IC15
N74F173N	NJ	16	PLDIL	46	IC15
N74F174D	DJ	16	SO16	46	IC15
N74F174N	NJ	16	PLDIL	46	IC15
N74F175D	DJ	16	SO16	46	IC15
N74F175N	NJ	16	PLDIL	46	IC15
N74F1761A	A	44	PLCC	51	IC15
N74F1761N	N	48	PLDIL	51	IC15
N74F1762A	A	44	PLCC	51	IC15
N74F1762N	N	40	PLDIL	51	IC15
N74F1763A	A	44	PLCC	51;91	IC15 IC19
N74F1763N	N	48	PLDIL	51;91	IC15 IC19
N74F1764–1A	A	44	PLCC	51;91	IC19
N74F1764–1N	N	48	PLDIL	51;91	IC19
N74F1764A	A	44	PLCC	51;91	IC19
N74F1764N	NY	48	PLDIL	51;91	IC15 IC19
N74F1765–1A	A	44	PLCC	51;91	IC19
N74F1765–1N	N	48	PLDIL	51;91	IC19
N74F1765A	A	44	PLCC	51;91	IC19
N74F1765N	NY	48	PLDIL	51;91	IC15 IC19
N74F181D	DN	24	SO24	43	IC15
N74F181N	NN	24	PLDIL	43	IC15
N74F182D	DJ	16	SO16	43	IC15
N74F182N	NJ	16	PLDIL	43	IC15
N74F189AD	D	16	SO16	49	IC15
N74F189AN	N	16	PLDIL	49	IC15
N74F190D	DJ	16	SO16	45	IC15
N74F190N	NJ	16	PLDIL	45	IC15
N74F191D	DJ	16	SO16	45	IC15
N74F191N	NJ	16	PLDIL	45	IC15
N74F192D	DJ	16	SO16	45	IC15
N74F192N	NJ	16	PLDIL	45	IC15
N74F193D	DJ	16	SO16	45	IC15
N74F193N	NJ	16	PLDIL	45	IC15
N74F194D	DJ	16	SO16	50	IC15
N74F194N	NJ	16	PLDIL	50	IC15
N74F195D	DJ	16	SO16	50	IC15
N74F195N	NJ	16	PLDIL	50	IC15
N74F198N	NN	24	PLDIL	50	IC15
N74F199N	NN	24	PLDIL	50	IC15
N74F20D	DH	14	SO14	47	IC15
N74F20N	NH	14	PLDIL	47	IC15
N74F225N	NL	20	PLDIL	50	IC15

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N74F240D	DL	20	SO20	43	IC15
N74F240N	NL	20	PLDIL	43	IC15
N74F241D	DL	20	SO20	43	IC15
N74F241N	NL	20	PLDIL	43	IC15
N74F242D	DH	14	SO14	44;52	IC15
N74F242N	NH	14	PLDIL	44;52	IC15
N74F243D	DH	14	SO14	44;52	IC15
N74F243N	NH	14	PLDIL	44;52	IC15
N74F244D	DL	20	SO20	43	IC15
N74F244N	NL	20	PLDIL	43	IC15
N74F245D	DL	20	SO20	44;52	IC15
N74F245N	NL	20	PLDIL	44;52	IC15
N74F251AD	DJ	16	SO16	49	IC15
N74F251AN	NJ	16	PLDIL	49	IC15
N74F251D	DJ	16	SO16	49	IC15
N74F251N	NJ	16	PLDIL	49	IC15
N74F253D	DJ	16	SO16	49	IC15
N74F253N	NJ	16	PLDIL	49	IC15
N74F256D	DJ	16	SO16	48	IC15
N74F256N	NJ	16	PLDIL	48	IC15
N74F257AD	DJ	16	SO16	49;51	IC15
N74F257AN	NJ	16	PLDIL	49;51	IC15
N74F257D	DJ	16	SO16	49;51	IC15
N74F257N	NJ	16	PLDIL	49;51	IC15
N74F258AD	DJ	16	SO16	49;51	IC15
N74F258AN	NJ	16	PLDIL	49;51	IC15
N74F258D	DJ	16	SO16	49;51	IC15
N74F258N	NJ	16	PLDIL	49;51	IC15
N74F259D	DJ	16	SO16	48	IC15
N74F259N	NJ	16	PLDIL	48	IC15
N74F260D	DH	14	SO14	48	IC15
N74F260N	NH	14	PLDIL	48	IC15
N74F269D	DN	24	SO24	45	IC15
N74F269N	NN	24	PLDIL	45	IC15
N74F27D	DH	14	SO14	48	IC15
N74F27N	NH	14	PLDIL	48	IC15
N74F273D	DL	20	SO20	46	IC15
N74F273N	NL	20	PLDIL	46	IC15
N74F280AD	DH	14	SO14	43	IC15
N74F280AN	NH	14	PLDIL	43	IC15
N74F280BD	DH	14	SO14	43	IC15
N74F280BN	NH	14	PLDIL	43	IC15
N74F283D	DJ	16	SO16	43	IC15
N74F283N	NJ	16	PLDIL	43	IC15
N74F2952N	NN	24	PLDIL	52	IC15
N74F2953N	NN	24	PLDIL	52	IC15
N74F298D	DJ	16	SO16	50	IC15
N74F298N	NJ	16	PLDIL	50	IC15
N74F299D	DL	20	SO20	50	IC15
N74F299N	NL	20	PLDIL	50	IC15
N74F30D	DH	14	SO14	48	IC15
N74F30N	NH	14	PLDIL	48	IC15
N74F30240N	NN	24	PLDIL	46	IC15
N74F30244N	NN	24	PLDIL	46	IC15
N74F30245F	F	24	CERDIP	46;52	IC15
N74F30245N	N	24	PLDIL	46;52	IC15
N74F3037N	NJ	16	PLDIL	46	IC15

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N74F3038N	NJ	16	PLDIL	46	IC15
N74F3040N	NJ	16	PLDIL	46	IC15
N74F30640N	NN	24	PLDIL	46;52	IC15
N74F32D	DH	14	SO14	48	IC15
N74F32N	NH	14	PLDIL	48	IC15
N74F322N	NL	20	PLDIL	50	IC15
N74F323N	NL	20	PLDIL	50	IC15
N74F350D	DJ	16	SO16	50	IC15
N74F350N	NJ	16	PLDIL	50	IC15
N74F352D	DJ	16	SO16	49	IC15
N74F352N	NJ	16	PLDIL	49	IC15
N74F353D	DJ	16	SO16	49	IC15
N74F353N	NJ	16	PLDIL	49	IC15
N74F365D	DJ	16	SO16	43	IC15
N74F365N	NJ	16	PLDIL	43	IC15
N74F366D	DJ	16	SO16	43	IC15
N74F366N	NJ	16	PLDIL	43	IC15
N74F367D	DJ	16	SO16	43	IC15
N74F367N	NJ	16	PLDIL	43	IC15
N74F368D	DJ	16	SO16	43	IC15
N74F368N	NJ	16	PLDIL	43	IC15
N74F37D	DH	14	SO14	48	IC15
N74F37N	NH	14	PLDIL	48	IC15
N74F373D	DL	20	SO20	46	IC15
N74F373N	NL	20	PLDIL	46	IC15
N74F374D	DL	20	SO20	46	IC15
N74F374N	NL	20	PLDIL	46	IC15
N74F377D	DL	20	SO20	46	IC15
N74F377N	NL	20	PLDIL	46	IC15
N74F378D	DJ	16	SO16	46	IC15
N74F378N	NJ	16	PLDIL	46	IC15
N74F379D	DJ	16	SO16	46	IC15
N74F379N	NJ	16	PLDIL	46	IC15
N74F38D	DH	14	SO14	48	IC15
N74F38N	NH	14	PLDIL	48	IC15
N74F381D	DL	20	SO20	43	IC15
N74F381N	NL	20	PLDIL	43	IC15
N74F382D	DL	20	SO20	43	IC15
N74F382N	NL	20	PLDIL	43	IC15
N74F384N	NL	20	PLDIL	51	IC15
N74F385D	DL	20	SO20	43	IC15
N74F385N	NL	20	PLDIL	43	IC15
N74F393N	NH	14	PLDIL	45	IC15
N74F395AN	NJ	16	PLDIL	50	IC15
N74F395D	DJ	16	SO16	50	IC15
N74F395N	NJ	16	PLDIL	50	IC15
N74F398D	DL	20	SO20	50	IC15
N74F398N	NL	20	PLDIL	50	IC15
N74F399D	DJ	16	SO16	50	IC15
N74F399N	NJ	16	PLDIL	50	IC15
N74F40D	DH	14	SO14	48	IC15
N74F40N	NH	14	PLDIL	48	IC15
N74F412D	DN	24	SO24	48	IC15
N74F412N	NN	24	PLDIL	48	IC15
N74F432D	DN	24	SO24	48	IC15
N74F432N	NN	24	PLDIL	48	IC15
N74F455D	DN	24	SO24	43	IC15

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N74F455N	NN	24	PLDIL	43	IC15
N74F456D	DN	24	SO24	43	IC15
N74F456N	NN	24	PLDIL	43	IC15
N74F51D	DH	14	SO14	47;48	IC15
N74F51N	NH	14	PLDIL	47;48	IC15
N74F521D	DL	20	SO20	44	IC15
N74F521N	NL	20	PLDIL	44	IC15
N74F524D	DL	20	SO20	44	IC15
N74F524N	NL	20	PLDIL	44	IC15
N74F533D	DL	20	SO20	48	IC15
N74F533N	NL	20	PLDIL	48	IC15
N74F534D	DL	20	SO20	46	IC15
N74F534N	NL	20	PLDIL	46	IC15
N74F537D	DL	20	SO20	45	IC15
N74F537N	NL	20	PLDIL	45	IC15
N74F538D	DL	20	SO20	45	IC15
N74F538N	NL	20	PLDIL	45	IC15
N74F539D	DL	20	SO20	45	IC15
N74F539N	NL	20	PLDIL	45	IC15
N74F540D	DL	20	SO20	43	IC15
N74F540N	NL	20	PLDIL	43	IC15
N74F541D	DL	20	SO20	43	IC15
N74F541N	NL	20	PLDIL	43	IC15
N74F543D	DN	24	SO24	48	IC15
N74F543N	NN	24	PLDIL	48	IC15
N74F544D	DN	24	SO24	48	IC15
N74F544N	NN	24	PLDIL	48	IC15
N74F545D	DL	20	SO20	44;52	IC15
N74F545N	NL	20	PLDIL	44;52	IC15
N74F547D	DL	20	SO20	45	IC15
N74F547N	NL	20	PLDIL	45	IC15
N74F548D	DL	20	SO20	45	IC15
N74F548N	NL	20	PLDIL	45	IC15
N74F550N	NQ	28	PLDIL	52	IC15
N74F551N	NQ	28	PLDIL	52	IC15
N74F552N	NQ	28	PLDIL	52	IC15
N74F563N	NL	20	PLDIL	46	IC15
N74F564N	NL	20	PLDIL	46	IC15
N74F568N	NL	20	PLDIL	45	IC15
N74F569N	NL	20	PLDIL	45	IC15
N74F573N	NL	20	PLDIL	46	IC15
N74F574N	NL	20	PLDIL	46	IC15
N74F579D	DL	20	SO20	45	IC15
N74F579N	NL	20	PLDIL	45	IC15
N74F582D	DN	24	SO24	43	IC15
N74F582N	NN	24	PLDIL	43	IC15
N74F583D	DJ	16	SO16	43	IC15
N74F583N	NJ	16	PLDIL	43	IC15
N74F588N	NL	20	PLDIL	52	IC15
N74F595N	NJ	16	PLDIL	50	IC15
N74F597N	NJ	16	PLDIL	50	IC15
N74F598N	NJ	16	PLDIL	50	IC15
N74F604D	DQ	28	SO28	48	IC15
N74F604N	NQ	28	PLDIL	48	IC15
N74F605D	DQ	28	SO28	48	IC15
N74F605N	NQ	28	PLDIL	48	IC15
N74F620D	DL	20	SO20	44;52	IC15

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N74F620N	NL	20	PLDIL	44;52	IC15
N74F621D	DL	20	SO20	44;52	IC15
N74F621N	NL	20	PLDIL	44;52	IC15
N74F622D	DL	20	SO20	44;52	IC15
N74F622N	NL	20	PLDIL	44;52	IC15
N74F623D	DL	20	SO20	44;52	IC15
N74F623N	NL	20	PLDIL	44;52	IC15
N74F630N	NQ	28	PLDIL	51	IC15
N74F631N	NQ	28	PLDIL	51	IC15
N74F64D	DH	14	SO14	47;48	IC15
N74F64N	NH	14	PLDIL	47;48	IC15
N74F640D	DL	20	SO20	44;52	IC15
N74F640N	NL	20	PLDIL	44;52	IC15
N74F641D	DL	20	SO20	44;52	IC15
N74F641N	NL	20	PLDIL	44;52	IC15
N74F642D	DL	20	SO20	44;52	IC15
N74F642N	NL	20	PLDIL	44;52	IC15
N74F646D	DN	24	SO24	44;50;52	IC15
N74F646N	NN	24	PLDIL	44;50;52	IC15
N74F647D	DN	24	SO24	44;50;52	IC15
N74F647N	NN	24	PLDIL	44;50;52	IC15
N74F648D	DN	24	SO24	44;50;52	IC15
N74F648N	NN	24	PLDIL	44;50;52	IC15
N74F649D	DN	24	SO24	44;50;52	IC15
N74F649N	NN	24	PLDIL	44;50;52	IC15
N74F651F	FN	24	CERDIP	50;52	IC15
N74F652F	FN	24	CERDIP	50;52	IC15
N74F653F	FN	24	CERDIP	50;52	IC15
N74F654F	FN	24	CERDIP	50;52	IC15
N74F655AD	DN	24	SO24	43	IC15
N74F655AN	NN	24	PLDIL	43	IC15
N74F655D	DN	24	SO24	43	IC15
N74F655N	NN	24	PLDIL	43	IC15
N74F656AD	DN	24	SO24	44	IC15
N74F656AN	NN	24	PLDIL	44	IC15
N74F656D	DN	24	SO24	43	IC15
N74F656N	NN	24	PLDIL	43	IC15
N74F657D	DN	24	SO24	44;52	IC15
N74F657N	NN	24	PLDIL	44;52	IC15
N74F670N	NJ	16	PLDIL	50	IC15
N74F673AN	NN	24	PLDIL	50	IC15
N74F673N	NN	24	PLDIL	50	IC15
N74F674N	NN	24	PLDIL	50	IC15
N74F675N	NN	24	PLDIL	50	IC15
N74F676D	DN	24	SO24	50	IC15
N74F676N	NN	24	PLDIL	50	IC15
N74F711N	NL	20	PLDIL	49	IC15
N74F712N	NN	24	PLDIL	49	IC15
N74F723N	NN	24	PLDIL	49	IC15
N74F725N	NN	24	PLDIL	49	IC15
N74F732N	NL	20	PLDIL	49	IC15
N74F733N	NL	20	PLDIL	49	IC15
N74F74D	DH	14	SO14	46	IC15
N74F74N	NH	14	PLDIL	46	IC15
N74F764–1A	AW	40	PLCC	51;91	IC15 IC19
N74F764–1N	NW	40	PLDIL	51;91	IC15

extended type no.	package code	no. of pins	pin position	catalogue page no.	handbook
N74F764–1N	NW	40	PLDIL	51:91	IC19
N74F764A	AW	40	PLCC	51;91	IC15 IC19
N74F764AA	AW	40	PLCC	51;91	IC15 IC19
N74F764AN	N	40	PLDIL	51;91	IC19
N74F764N	NW	40	PLDIL	51;91	IC15 IC19
N74F765–1A	AW	40	PLCC	51;91	IC15 IC19
N74F765–1N	NW	40	PLDIL	51;91	IC15 IC19
N74F765A	AW	40	PLCC	51;91	IC15 IC19
N74F765AA	AW	40	PLCC	51;91	IC15 IC19
N74F765AN	N	40	PLDIL	51;91	IC19
N74F765N	NW	40	PLDIL	51;91	IC15 IC19
N74F779D	DJ	16	SO16	45	IC15
N74F779N	NJ	16	PLDIL	45	IC15
N74F784N	NL	20	PLDIL	51	IC15
N74F786D	D	16	SO16	51	IC19
N74F786N	N	16	PLDIL	51	IC19
N74F804N	NL	20	PLDIL	46	IC15
N74F805N	NL	20	PLDIL	46	IC15
N74F808N	NL	20	PLDIL	46	IC15
N74F821N	NN	24	PLDIL	50	IC15
N74F822N	NN	24	PLDIL	51	IC15
N74F823N	NN	24	PLDIL	51	IC15
N74F824N	NN	24	PLDIL	51	IC15
N74F825N	NN	24	PLDIL	51	IC15
N74F826N	NN	24	PLDIL	51	IC15
N74F827D	DN	24	SO24	44	IC15
N74F827N	NN	24	PLDIL	44	IC15
N74F828D	DN	24	SO24	44	IC15
N74F828N	NN	24	PLDIL	44	IC15
N74F83D	DJ	16	SO16	43	IC15
N74F83N	NJ	16	PLDIL	43	IC15
N74F832N	NL	20	PLDIL	46	IC15
N74F838D	D	20	SO20	51	IC15
N74F838N	N	20	PLDIL	51	IC15
N74F841D	DN	24	SO24	49	IC15
N74F841N	NN	24	PLDIL	49	IC15
N74F842D	DN	24	SO24	49	IC15
N74F842N	NN	24	PLDIL	49	IC15
N74F843N	NN	24	PLDIL	49	IC15
N74F844D	DN	24	SO24	49	IC15
N74F844N	NN	24	PLDIL	49	IC15
N74F845N	NN	24	PLDIL	49	IC15
N74F846D	DN	24	SO24	49	IC15
N74F846N	NN	24	PLDIL	49	IC15
N74F85D	DJ	16	SO16	44	IC15
N74F85N	NJ	16	PLDIL	44	IC15
N74F86D	DH	14	SO14	47;91	IC15
N74F86N	NH	14	PLDIL	47;91	IC15
N74F861D	DN	24	SO24	52	IC15

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N74F861N	NN	24	PLDIL	52	IC15
N74F862D	DN	24	SO24	52	IC15
N74F862N	NN	24	PLDIL	52	IC15
N74F863D	DN	24	SO24	52	IC15
N74F863N	NN	24	PLDIL	52	IC15
N74F864D	DN	24	SO24	52	IC15
N74F864N	NN	24	PLDIL	52	IC15
N74F881D	DN	24	SO24	43	IC15
N74F881N	NN	24	PLDIL	43	IC15
N74F882D	DN	24	SO24	43	IC15
N74F882N	NN	24	PLDIL	43	IC15
N74LS00D	DH	14	SO14	47	IC09
N74LS00N	NH	14	PLDIL	47	IC09
N74LS01D	DH	14	SO14	47	IC09
N74LS01N	NH	14	PLDIL	47	IC09
N74LS02D	DH	14	SO14	48	IC09
N74LS02N	NH	14	PLDIL	48	IC09
N74LS04D	DH	14	SO14	48	IC09
N74LS04N	NH	14	PLDIL	48	IC09
N74LS05D	DH	14	SO14	48	IC09
N74LS05N	NH	14	PLDIL	48	IC09
N74LS08D	DH	14	SO14	47	IC09
N74LS08N	NH	14	PLDIL	47	IC09
N74LS09D	DH	14	SO14	47	IC09
N74LS09N	NH	14	PLDIL	47	IC09
N74LS10D	DH	14	SO14	47	IC09
N74LS10N	NH	14	PLDIL	47	IC09
N74LS107D	DH	14	SO14	46	IC09
N74LS107N	NH	14	PLDIL	46	IC09
N74LS109AD	DJ	16	SO16	46	IC09
N74LS109AN	NJ	16	PLDIL	46	IC09
N74LS11D	DH	14	SO14	47	IC09
N74LS11N	NH	14	PLDIL	47	IC09
N74LS112D	DJ	16	SO16	46	IC09
N74LS112N	NJ	16	PLDIL	46	IC09
N74LS113N	NH	14	PLDIL	46	IC09
N74LS125AD	DH	14	SO14	43	IC09
N74LS125AN	NH	14	PLDIL	43	IC09
N74LS126AD	DH	14	SO14	43	IC09
N74LS126AN	NH	14	PLDIL	43	IC09
N74LS13D	DH	14	SO14	51	IC09
N74LS13N	NH	14	PLDIL	51	IC09
N74LS132D	DH	14	SO14	51	IC09
N74LS132N	NH	14	PLDIL	51	IC09
N74LS136D	DH	14	SO14	47	IC09
N74LS136N	NH	14	PLDIL	47	IC09
N74LS138D	DJ	16	SO16	45	IC09
N74LS138N	NJ	16	PLDIL	45	IC09
N74LS139D	DJ	16	SO16	45	IC09
N74LS139N	NJ	16	PLDIL	45	IC09
N74LS14D	DH	14	SO14	51	IC09
N74LS14N	NH	14	PLDIL	51	IC09
N74LS151D	DJ	16	SO16	49	IC09
N74LS151N	NJ	16	PLDIL	49	IC09
N74LS153D	DJ	16	SO16	49	IC09
N74LS153N	NJ	16	PLDIL	49	IC09
N74LS154D	DN	24	SO24	45	IC09

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N74LS154N	NN	24	PLDIL	45	IC09
N74LS155D	DJ	16	SO16	45	IC09
N74LS155N	NJ	16	PLDIL	45	IC09
N74LS156D	DJ	16	SO16	45	IC09
N74LS156N	NJ	16	PLDIL	45	IC09
N74LS157D	DJ	16	SO16	49;51	IC09
N74LS157N	NJ	16	PLDIL	49;51	IC09
N74LS158D	DJ	16	SO16	49;51	IC09
N74LS158N	NJ	16	PLDIL	49;51	IC09
N74LS160AN	NJ	16	PLDIL	44	IC09
N74LS161AD	DJ	16	SO16	45	IC09
N74LS161AN	NJ	16	PLDIL	45	IC09
N74LS162AN	NJ	16	PLDIL	45	IC09
N74LS163AD	DJ	16	SO16	45	IC09
N74LS163AN	NJ	16	PLDIL	45	IC09
N74LS164D	DH	14	SO14	50	IC09
N74LS164N	NH	14	PLDIL	50	IC09
N74LS168AN	NJ	16	PLDIL	45	IC09
N74LS169AD	DJ	16	SO16	45	IC09
N74LS169AN	NJ	16	PLDIL	45	IC09
N74LS170N	NJ	16	PLDIL	50	IC09
N74LS173D	DJ	16	SO16	46	IC09
N74LS173N	NJ	16	PLDIL	46	IC09
N74LS174D	DJ	16	SO16	46	IC09
N74LS174N	NJ	16	PLDIL	46	IC09
N74LS175D	DJ	16	SO16	46	IC09
N74LS175N	NJ	16	PLDIL	46	IC09
N74LS1801F	FN	24	CERDIP	51	IC09
N74LS1802F	–	–	–	51	IC09
N74LS181N	NN	24	PLDIL	43	IC09
N74LS191D	DJ	16	SO16	45	IC09
N74LS191N	NJ	16	PLDIL	45	IC09
N74LS192N	NJ	16	PLDIL	45	IC09
N74LS193D	DJ	16	SO16	45	IC09
N74LS193N	NJ	16	PLDIL	45	IC09
N74LS194AD	DJ	16	SO16	50	IC09
N74LS194AN	NJ	16	PLDIL	50	IC09
N74LS195AD	DJ	16	SO16	50	IC09
N74LS195AN	NJ	16	PLDIL	50	IC09
N74LS197D	DH	14	SO14	45	IC09
N74LS197N	NH	14	PLDIL	45	IC09
N74LS20D	DH	14	SO14	47	IC09
N74LS20N	NH	14	PLDIL	47	IC09
N74LS21D	DH	14	SO14	47	IC09
N74LS21N	NH	14	PLDIL	47	IC09
N74LS240D	DL	20	SO20	43	IC09
N74LS240N	NL	20	PLDIL	43	IC09
N74LS241D	DL	20	SO20	43	IC09
N74LS241N	NL	20	PLDIL	43	IC09
N74LS242N	NH	14	PLDIL	44;52	IC09
N74LS243N	NH	14	PLDIL	44;52	IC09
N74LS244D	DL	20	SO20	43	IC09
N74LS244N	NL	20	PLDIL	43	IC09
N74LS245D	DL	20	SO20	44;52	IC09
N74LS245N	NL	20	PLDIL	44;52	IC09
N74LS251AD	DJ	16	SO16	49	IC09
N74LS251AN	NJ	16	PLDIL	49	IC09

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N74LS251D	DJ	16	SO16	49	IC09
N74LS251N	NJ	16	PLDIL	49	IC09
N74LS253D	DJ	16	SO16	49	IC09
N74LS253N	NJ	16	PLDIL	49	IC09
N74LS256D	DJ	16	SO16	48	IC09
N74LS256N	NJ	16	PLDIL	48	IC09
N74LS257AD	DJ	16	SO16	49;51	IC09
N74LS257AN	NJ	16	PLDIL	49;51	IC09
N74LS258AD	DJ	16	SO16	49;51	IC09
N74LS258AN	NJ	16	PLDIL	49;51	IC09
N74LS259D	DJ	16	SO16	48	IC09
N74LS259N	NJ	16	PLDIL	48	IC09
N74LS26D	DH	14	SO14	48	IC09
N74LS26N	NH	14	PLDIL	48	IC09
N74LS260D	DH	14	SO14	48	IC09
N74LS260N	NH	14	PLDIL	48	IC09
N74LS266D	DH	14	SO14	47	IC09
N74LS266N	NH	14	PLDIL	47	IC09
N74LS27D	DH	14	SO14	48	IC09
N74LS27N	NH	14	PLDIL	48	IC09
N74LS273D	DL	20	SO20	46	IC09
N74LS273N	NL	20	PLDIL	46	IC09
N74LS283D	DJ	16	SO16	43	IC09
N74LS283N	NJ	16	PLDIL	43	IC09
N74LS290D	DH	14	SO14	45	IC09
N74LS290N	NH	14	PLDIL	45	IC09
N74LS293D	DH	14	SO14	45	IC09
N74LS293N	NH	14	PLDIL	45	IC09
N74LS295BN	NH	14	PLDIL	50	IC09
N74LS298N	NJ	16	PLDIL	50	IC09
N74LS30D	DH	14	SO14	48	IC09
N74LS30N	NH	14	PLDIL	48	IC09
N74LS301D	–	–	–	49	IC09
N74LS301N	NJ	16	PLDIL	49	IC09
N74LS32D	DH	14	SO14	48	IC09
N74LS32N	NH	14	PLDIL	48	IC09
N74LS33N	NH	14	PLDIL	48	IC09
N74LS352N	NJ	16	PLDIL	49	IC09
N74LS353D	DJ	16	SO16	49	IC09
N74LS353N	NJ	16	PLDIL	49	IC09
N74LS363N	NL	20	PLDIL	48	IC09
N74LS364N	NL	20	PLDIL	46	IC09
N74LS365AD	DJ	16	SO16	43	IC09
N74LS365AN	NJ	16	PLDIL	43	IC09
N74LS366AN	NJ	16	PLDIL	43	IC09
N74LS367AD	DJ	16	SO16	43	IC09
N74LS367AN	NJ	16	PLDIL	43	IC09
N74LS368AD	DJ	16	SO16	43	IC09
N74LS368AN	NJ	16	PLDIL	43	IC09
N74LS37N	NH	14	PLDIL	48	IC09
N74LS373D	DL	20	SO20	46	IC09
N74LS373N	NL	20	PLDIL	46	IC09
N74LS374D	DL	20	SO20	46	IC09
N74LS374N	NL	20	PLDIL	46	IC09
N74LS375D	DJ	16	SO16	48	IC09
N74LS375N	NJ	16	PLDIL	48	IC09
N74LS377D	DL	20	SO20	46	IC09

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N74LS377N	NL	20	PLDIL	46	IC09
N74LS378N	NJ	16	PLDIL	46	IC09
N74LS38D	DH	14	SO14	48	IC09
N74LS38N	NH	14	PLDIL	48	IC09
N74LS390D	DJ	16	SO16	45	IC09
N74LS390N	NJ	16	PLDIL	45	IC09
N74LS393D	DH	14	SO14	45	IC09
N74LS393N	NH	14	PLDIL	45	IC09
N74LS395AN	NJ	16	PLDIL	50	IC09
N74LS40N	NH	14	PLDIL	48	IC09
N74LS42D	DJ	16	SO16	45	IC09
N74LS42N	NJ	16	PLDIL	45	IC09
N74LS429N	N	28	PLDIL	51;91	IC19
N74LS445N	NJ	16	PLDIL	45	IC09
N74LS490N	NJ	16	PLDIL	45	IC09
N74LS51D	DH	14	SO14	47;48	IC09
N74LS51N	NH	14	PLDIL	47;48	IC09
N74LS54D	DH	14	SO14	47;48	IC09
N74LS54N	NH	14	PLDIL	47;48	IC09
N74LS540D	DL	20	SO20	43	IC09
N74LS540N	NL	20	PLDIL	43	IC09
N74LS541D	DL	20	SO20	43	IC09
N74LS541N	NL	20	PLDIL	43	IC09
N74LS568AN	NL	20	PLDIL	45	IC09
N74LS569AN	NL	20	PLDIL	45	IC09
N74LS620N	NL	20	PLDIL	44;52	IC09
N74LS621N	NL	20	PLDIL	44;52	IC09
N74LS622N	NL	20	PLDIL	44;52	IC09
N74LS623N	NL	20	PLDIL	44;52	IC09
N74LS640–1N	NL	20	PLDIL	44;52	IC09
N74LS640D	DL	20	SO20	44;52	IC09
N74LS640N	NL	20	PLDIL	44;52	IC09
N74LS641–1N	NL	20	PLDIL	44;52	IC09
N74LS641N	NL	20	PLDIL	44;52	IC09
N74LS642–1N	NL	20	PLDIL	44;52	IC09
N74LS642N	NL	20	PLDIL	44;52	IC09
N74LS645–1D	DL	20	SO20	44;52	IC09
N74LS645–1N	NL	20	PLDIL	44;52	IC09
N74LS645D	DL	20	SO20	44;52	IC09
N74LS645N	NL	20	PLDIL	44;52	IC09
N74LS670D	DJ	16	SO20	50	IC09
N74LS670N	NJ	16	PLDIL	50	IC09
N74LS73D	DH	14	SO14	46	IC09
N74LS73N	NH	14	PLDIL	46	IC09
N74LS74AD	DH	14	SO14	46	IC09
N74LS74AN	NH	14	PLDIL	46	IC09
N74LS75D	DJ	16	SO16	48	IC09
N74LS75N	NJ	16	PLDIL	48	IC09
N74LS76N	NJ	16	PLDIL	46	IC09
N74LS764N	NW	40	PLDIL	51	IC09
N74LS765N	NW	40	PLDIL	51	IC09
N74LS83AD	DJ	16	SO16	43	IC09
N74LS83AN	NJ	16	PLDIL	43	IC09
N74LS85D	DJ	16	SO16	44	IC09
N74LS85N	NJ	16	PLDIL	44	IC09
N74LS86D	DH	14	SO14	47	IC09
N74LS86N	NH	14	PLDIL	47	IC09

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N74LS90N	NH	14	PLDIL	44	IC09
N74LS92D	DH	14	SO14	44	IC09
N74LS92N	NH	14	PLDIL	44	IC09
N74LS93D	DH	14	SO14	44	IC09
N74LS93N	NH	14	PLDIL	44	IC09
N74LS95BN	NH	14	PLDIL	50	IC09
N74LS96N	NJ	16	PLDIL	50	IC09
N74S00D	DH	14	SO14	47	IC09
N74S00N	NH	14	PLDIL	47	IC09
N74S02D	DH	14	SO14	48	IC09
N74S02N	NH	14	PLDIL	48	IC09
N74S03D	DH	14	SO14	47	IC09
N74S03N	NH	14	PLDIL	47	IC09
N74S04D	DH	14	SO14	48	IC09
N74S04N	NH	14	PLDIL	48	IC09
N74S05D	DH	14	SO14	48	IC09
N74S05N	NH	14	PLDIL	48	IC09
N74S08D	DH	14	SO14	47	IC09
N74S08N	NH	14	PLDIL	47	IC09
N74S10D	DH	14	SO14	47	IC09
N74S10N	NH	14	PLDIL	47	IC09
N74S11D	DH	14	SO14	47	IC09
N74S11N	NH	14	PLDIL	47	IC09
N74S112D	DJ	16	SO16	46	IC09
N74S112N	NJ	16	PLDIL	46	IC09
N74S113D	DH	14	SO14	46	IC09
N74S113N	NJ	16	PLDIL	46	IC09
N74S133D	DJ	16	SO16	48	IC09
N74S133N	NJ	16	PLDIL	48	IC09
N74S134D	DJ	16	SO16	48	IC09
N74S134N	NJ	16	PLDIL	48	IC09
N74S135N	NJ	16	PLDIL	47	IC09
N74S138D	DJ	16	SO16	45	IC09
N74S138N	NJ	16	PLDIL	45	IC09
N74S139D	DJ	16	SO16	45	IC09
N74S139N	NJ	16	PLDIL	45	IC09
N74S140N	NH	14	PLDIL	48	IC09
N74S151D	DJ	16	SO16	49	IC09
N74S151N	NJ	16	PLDIL	49	IC09
N74S153D	DJ	16	SO16	49	IC09
N74S153N	NJ	16	PLDIL	49	IC09
N74S157D	DJ	16	SO16	49;51	IC09
N74S157N	NJ	16	PLDIL	49;51	IC09
N74S158D	DJ	16	SO16	49;51	IC09
N74S158N	NJ	16	PLDIL	49;51	IC09
N74S168AD	DJ	16	SO16	45	IC09
N74S168N	NJ	16	PLDIL	45	IC09
N74S169AD	DJ	16	SO16	45	IC09
N74S169AN	NJ	16	PLDIL	45	IC09
N74S172N	NN	24	PLDIL	50	IC09
N74S174D	DJ	16	SO16	46	IC09
N74S174N	NJ	16	PLDIL	46	IC09
N74S175D	DJ	16	SO16	46	IC09
N74S175N	NJ	16	PLDIL	46	IC09
N74S181N	NN	24	PLDIL	43	IC09
N74S182D	DJ	16	SO16	43	IC09
N74S182N	NJ	16	PLDIL	43	IC09

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N74S189D	DJ	16	SO16	49	IC09
N74S189F	FJ	16	CERDIP	49	IC09
N74S189N	NJ	16	PLDIL	49	IC09
N74S194D	DJ	16	SO16	50	IC09
N74S194N	NJ	16	PLDIL	50	IC09
N74S195N	NJ	16	PLDIL	50	IC09
N74S20D	DH	14	SO14	47	IC09
N74S20N	NH	14	PLDIL	47	IC09
N74S225N	NL	20	PLDIL	50	IC09
N74S240D	DL	20	SO20	43	IC09
N74S240N	NL	20	PLDIL	43	IC09
N74S241N	NL	20	PLDIL	43	IC09
N74S242N	NH	14	PLDIL	44;52	IC09
N74S243N	NH	14	PLDIL	44;52	IC09
N74S244N	NL	20	PLDIL	43	IC09
N74S251N	NJ	16	PLDIL	49	IC09
N74S253D	DJ	16	SO16	49	IC09
N74S253N	NJ	16	PLDIL	49	IC09
N74S257D	DJ	16	SO16	49;51	IC09
N74S257N	NJ	16	PLDIL	49;51	IC09
N74S258N	NJ	16	PLDIL	49;51	IC09
N74S260D	DH	14	SO14	48	IC09
N74S260N	NH	14	PLDIL	48	IC09
N74S273D	DL	20	SO20	46	IC09
N74S273N	NL	20	PLDIL	46	IC09
N74S280N	NH	14	PLDIL	43	IC09
N74S301D	–	–	–	49	–
N74S301N	NJ	16	PLDIL	49	IC09
N74S32D	DH	14	SO14	48	IC09
N74S32N	NH	14	PLDIL	48	IC09
N74S350N	NJ	16	PLDIL	50	IC09
N74S37D	DH	14	SO14	48	IC09
N74S37N	NH	14	PLDIL	48	IC09
N74S373D	DL	20	SO20	46	IC09
N74S373N	NL	20	PLDIL	46	IC09
N74S374D	DL	20	SO20	46	IC09
N74S374N	NL	20	PLDIL	46	IC09
N74S38D	DH	14	SO14	48	IC09
N74S38N	NH	14	PLDIL	48	IC09
N74S40N	NH	14	PLDIL	48	IC09
N74S51D	DH	14	SO14	47;48	IC09
N74S51N	NH	14	PLDIL	47;48	IC09
N74S534N	NL	20	PLDIL	46	IC09
N74S64D	NH	14	PLDIL	47;48	IC09
N74S64N	NH	14	PLDIL	47;48	IC09
N74S74D	DH	14	SO14	46	IC09
N74S74N	NH	14	PLDIL	46	IC09
N74S85D	DJ	16	SO16	44	IC09
N74S85N	NJ	16	PLDIL	44	IC09
N74S86D	DH	14	SO14	47	IC09
N74S86N	NH	14	PLDIL	47	IC09
N7400N	NH	14	PLDIL	47	IC09
N7402N	NH	14	PLDIL	48	IC09
N7403N	NH	14	PLDIL	47	IC09
N7404N	NH	14	PLDIL	48	IC09
N7405N	NH	14	PLDIL	48	IC09
N7406D	DH	14	SO14	43	IC09

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N7406N	NH	14	PLDIL	43	IC09
N7407D	DH	14	SO14	43	IC09
N7407N	NH	14	PLDIL	43	IC09
N7408N	NH	14	PLDIL	47	IC09
N7410N	NH	14	PLDIL	47	IC09
N74107N	NH	14	PLDIL	46	IC09
N74109N	NJ	16	PLDIL	46	IC09
N7411N	NH	14	PLDIL	47	IC09
N74116N	NN	24	PLDIL	48	IC09
N74121D	DH	14	SO14	49	IC09
N74121N	NH	14	PLDIL	49	IC09
N74123D	DJ	16	SO14	49	IC09
N74123N	NJ	16	PLDIL	49	IC09
N74125N	NH	14	PLDIL	43	IC09
N74126N	NH	14	PLDIL	43	IC09
N74128N	NH	14	PLDIL	48	IC09
N7413N	NH	14	PLDIL	51	IC09
N74132N	NH	14	PLDIL	51	IC09
N7414D	DH	14	SO14	51	IC09
N7414N	NH	14	PLDIL	51	IC09
N74145D	DJ	16	SO16	45	IC09
N74145N	NJ	16	PLDIL	45	IC09
N74147N	NJ	16	PLDIL	46	IC09
N74148D	DJ	16	SO16	46	IC09
N74148N	NJ	16	PLDIL	46	IC09
N74150N	NN	24	PLDIL	49	IC09
N74151N	NJ	16	PLDIL	49	IC09
N74153N	NJ	16	PLDIL	49	IC09
N74154N	NN	24	PLDIL	45	IC09
N74155N	NJ	16	PLDIL	45	IC09
N74156N	NJ	16	PLDIL	45	IC09
N74157N	NJ	16	PLDIL	49;51	IC09
N74158N	NJ	16	PLDIL	49;51	IC09
N7416N	NH	14	PLDIL	43	IC09
N74160N	NJ	16	PLDIL	44	IC09
N74161N	NJ	16	PLDIL	45	IC09
N74163N	NJ	16	PLDIL	45	IC09
N74164N	NH	14	PLDIL	50	IC09
N74165N	NJ	16	PLDIL	50	IC09
N74166D	DJ	16	SO16	50	IC09
N74166N	NJ	16	PLDIL	50	IC09
N7417D	DH	14	SO16	43	IC09
N7417N	NH	14	PLDIL	43	IC09
N74170N	NJ	16	PLDIL	50	IC09
N74173N	NJ	16	PLDIL	46	IC09
N74174N	NJ	16	PLDIL	46	IC09
N74175N	NJ	16	PLDIL	46	IC09
N74180N	NH	14	PLDIL	43	IC09
N74181N	NN	24	PLDIL	43	IC09
N74190N	NJ	16	PLDIL	45	IC09
N74191N	NJ	16	PLDIL	45	IC09
N74192N	NJ	16	PLDIL	45	IC09
N74193N	NJ	16	PLDIL	45	IC09
N74194N	NJ	16	PLDIL	50	IC09
N74195N	NJ	16	PLDIL	50	IC09
N74199N	NN	24	PLDIL	50	IC09
N7420N	NH	14	PLDIL	47	IC09

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extended type no.	package code	no. of pins	pin position	catalogue page no.	handbook
N7421N	NH	14	PLDIL	47	IC09
N74221D	DJ	16	SO16	49	IC09
N74221N	NJ	16	PLDIL	49	IC09
N7425N	NH	14	PLDIL	48	IC09
N7426N	NH	14	PLDIL	48	IC09
N7427N	NH	14	PLDIL	48	IC09
N74279D	DJ	16	SO16	48	IC09
N74279N	NJ	16	PLDIL	48	IC09
N7428N	NH	14	PLDIL	48	IC09
N74298N	NJ	16	PLDIL	50	IC09
N7430N	NH	14	PLDIL	48	IC09
N7432N	NH	14	PLDIL	48	IC09
N7433N	NH	14	PLDIL	48	IC09
N74365AN	NJ	16	PLDIL	43	IC09
N74366AN	NJ	16	PLDIL	43	IC09
N74367AN	NJ	16	PLDIL	43	IC09
N74368AN	NJ	16	PLDIL	43	IC09
N7437N	NH	14	PLDIL	48	IC09
N7438D	DH	14	SO14	48	IC09
N7438N	NH	14	PLDIL	48	IC09
N7439N	NH	14	PLDIL	48	IC09
N7440N	NH	14	PLDIL	48	IC09
N7442N	NJ	16	PLDIL	45	IC09
N7445N	NJ	16	PLDIL	45	IC09
N7450N	NH	14	PLDIL	47;48	–
N7451N	NH	14	PLDIL	47;48	IC09
N7473N	NH	14	PLDIL	46	IC09
N7474N	NH	14	PLDIL	46	IC09
N7475N	NJ	16	PLDIL	48	IC09
N7476N	NJ	16	PLDIL	46	IC09
N7483N	NJ	16	PLDIL	43	IC09
N7485N	NJ	16	PLDIL	44	IC09
N7486N	NH	14	PLDIL	47	IC09
N7490N	NH	14	PLDIL	44	IC09
N7491AN	N	14	PLDIL	50	IC09
N7492N	NH	14	PLDIL	44	IC09
N7493N	NH	14	PLDIL	44	IC09
N7494N	NJ	16	PLDIL	50	IC09
N7495N	NH	14	PLDIL	50	IC09
N7496N	NJ	16	PLDIL	50	IC09
N8TS805N	NL	20	PLDIL	62	IC09
N8TS807N	NL	20	PLDIL	62	IC09
N8TS808N	NL	20	PLDIL	62	IC09
N8T09N	NH	14	PLDIL	62	IC09
N8T10N	NJ	16	PLDIL	62	IC09
N8T125N	NL	20	PLDIL	63	IC09
N8T126N	NJ	16	PLDIL	62	IC09
N8T128N	NJ	16	PLDIL	62	IC09
N8T129N	NJ	16	PLDIL	62	IC09
N8T13N	NJ	16	PLDIL	62	IC09
N8T15N	NH	14	PLDIL	62	IC09
N8T16N	NH	14	PLDIL	62	IC09
N8T20N	NJ	16	PLDIL	63	IC09
N8T23N	NJ	16	PLDIL	62	IC09
N8T24N	NJ	16	PLDIL	63	IC09
N8T245N	NL	20	PLDIL	63	–
N8T26AN	NJ	16	PLDIL	62;63	IC09

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N8T28N	NJ	16	PLDIL	62;63	IC09
N8T31N	NN	24	PLDIL	63;67	IC14
N8T32–001N	NN	24	PLDIL	63;67	IC14
N8T32–004N	NN	24	PLDIL	63;67	IC14
N8T32N	NN	24	PLDIL	63;67	IC14
N8T34N	NJ	16	PLDIL	62;63	–
N8T3404N	NJ	16	PLDIL	62	IC09
N8T36N	NN	24	PLDIL	63;67	IC14
N8T37N	NJ	16	PLDIL	62	IC09
N8T38N	NJ	16	PLDIL	62;63	IC09
N8T380N	NH	14	PLDIL	62	IC09
N8T95N	NJ	16	PLDIL	62	IC09
N8T96N	NJ	16	PLDIL	62	IC09
N8T97D	DJ	16	SO16	62	IC09
N8T97N	NJ	16	PLDIL	62	IC09
N8T98N	NJ	16	PLDIL	62	IC09
N8X01AN	NH	14	PLDIL	67;91	IC14 IC19
N8X02AN	NW	40	PLDIL	67	IC14
N8X305A	AB	68	PLCC	67	IC14
N8X305N	NZ	50	PLDIL	67	IC14
N8X310N	NW	40	PLDIL	67	IC14
N8X320N	NW	40	PLDIL	67	IC14
N8X350F	FM	22	CERDIP	66;67	IC14
N8X350N	NM	22	PLDIL	66;67	IC14
N8X371N	NN	24	PLDIL	67	IC14
N8X372–000N	NN	24	PLDIL	67	IC14
N8X372–001N	NN	24	PLDIL	67	IC14
N8X372–002N	NN	24	PLDIL	67	IC14
N8X372–003N	NN	24	PLDIL	67	IC14
N8X372–004N	NN	24	PLDIL	67	IC14
N8X372–005N	NN	24	PLDIL	67	IC14
N8X372–006N	NN	24	PLDIL	67	IC14
N8X372–007N	NN	24	PLDIL	67	IC14
N8X372–008N	NN	24	PLDIL	67	IC14
N8X372N	NN	24	PLDIL	67	IC14
N8X376–000N	NN	24	PLDIL	67	IC14
N8X376–001N	NN	24	PLDIL	67	IC14
N8X376–002N	NN	24	PLDIL	67	IC14
N8X376–003N	NN	24	PLDIL	67	IC14
N8X376–004N	NN	24	PLDIL	67	IC14
N8X376–005N	NN	24	PLDIL	67	IC14
N8X376–006N	NN	24	PLDIL	67	IC14
N8X376–007N	NN	24	PLDIL	67	IC14
N8X376–008N	NN	24	PLDIL	67	IC14
N8X376–009N	NN	24	PLDIL	67	IC14
N8X376–010N	NN	24	PLDIL	67	IC14
N8X376–011N	NN	24	PLDIL	67	IC14
N8X376–012N	NN	24	PLDIL	67	IC14
N8X376N	NN	24	PLDIL	67	IC14
N8X400AS1SS	–	–	–	67	–
N8X400KT1SK	–	–	–	67	–
N8X401N	N	64	PLDIL	67	IC14
N8X41N	NN	24	PLDIL	63;67	IC14
N8X450N	NN	24	PLDIL	67	IC14
N8X60F	FQ	28	CERDIP	67;91	IC14 IC19

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N8X60N	NQ	28	PLDIL	67;91	IC14 IC19
N82HS1281N	N	28	PLDIL	65	IC10
N82HS187A	AQ	28	PLCC	65	IC10
N82HS187AA	AQ	28	PLCC	65	IC10
N82HS187AF	FN	24	CERDIP	65	–
N82HS187AN	NN	24	PLDIL	65	IC10
N82HS187F	FN	24	CERDIP	65	–
N82HS187N	NN	24	PLDIL	65	IC10
N82HS189A	AQ	28	PLCC	65	IC10
N82HS189AA	AQ	28	PLCC	65	IC10
N82HS189AF	FN	24	CERDIP	65	–
N82HS189AN	N	24	PLDIL	65	IC10
N82HS189F	FN	24	CERDIP	65	–
N82HS189N	NN	24	PLDIL	65	IC10
N82HS191A	A	28	PLCC	65	IC10
N82HS191N	N	24	PLDIL	65	IC10
N82HS191N3	N	24	PLDIL	65	IC10
N82HS195AF	FL	20	CERDIP	65	–
N82HS195AN	NL	20	PLDIL	65	IC10
N82HS195BN	NL	20	PLDIL	65	IC10
N82HS195N	NL	20	PLDIL	65	IC10
N82HS321A	A	28	PLCC	65	IC10
N82HS321AA	A	28	PLCC	65	IC10
N82HS321AF	FN	24	CERDIP	65	IC10
N82HS321AN	NN	24	PLDIL	65	IC10
N82HS321BA	A	28	PLCC	65	IC10
N82HS321BF	NN	24	PLDIL	65	IC10
N82HS321BN	NN	24	PLDIL	65	IC10
N82HS321F	FN	24	CERDIP	65	IC10
N82HS321N	NN	24	PLDIL	65	IC10
N82HS641AF	FN	24	CERDIP	65	IC10
N82HS641AN	NW	24	PLDIL	65	IC10
N82HS641BF	FN	24	CERDIP	65	IC10
N82HS641BN	NW	24	PLDIL	65	IC10
N82HS641F	FN	24	CERDIP	65	IC10
N82HS641N	NW	24	PLDIL	65	IC10
N82LS135A	A	20	PLCC	65	IC10
N82LS135N	NL	20	PLDIL	65	IC10
N82LS16D	D	16	SO16	66	IC10
N82LS16F	FJ	16	CERDIP	66	–
N82LS16N	NJ	16	PLDIL	66	IC10
N82S09A	A	28	PLCC	66	IC10
N82S09AA	A	28	PLCC	66	IC10
N82S09AF	FQ	28	CERDIP	66	–
N82S09AN	N	28	PLDIL	66	IC10
N82S09F	FQ	28	CERDIP	66	–
N82S09N	NQ	28	PLDIL	66	IC10
N82S115F	FN	24	CERDIP	65	–
N82S115I	IN	24	CERDIL	65	–
N82S115N	NN	24	PLDIL	65	IC10
N82S123A	A	20	PLCC	65	IC10
N82S123AA	A	20	PLCC	65	IC10
N82S123AD	DJ	16	SO16	65	–
N82S123AF	FJ	16	CERDIP	65	–
N82S123AN	NJ	16	PLDIL	65	IC10
N82S123D	DJ	16	SO16	65	–

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N82S123F	FJ	16	CERDIP	65	–
N82S123N	NJ	16	PLDIL	65	IC10
N82S126A	A	20	PLCC	65	IC10
N82S126AA	A	20	PLCC	65	IC10
N82S126AD	DJ	16	SO16	65	–
N82S126AF	FJ	16	CERDIP	65	–
N82S126AN	NJ	16	PLDIL	65	IC10
N82S126F	FJ	16	CERDIP	65	–
N82S126N	NJ	16	PLDIL	65	IC10
N82S129A	A	20	PLCC	65	IC10
N82S129AA	A	20	PLCC	65	IC10
N82S129AD	DJ	16	SO16	65	–
N82S129AF	FJ	16	CERDIP	65	–
N82S129AN	NJ	16	PLDIL	65	IC10
N82S129F	FJ	16	CERDIP	65	–
N82S129N	NJ	16	PLDIL	65	IC10
N82S130A	A	20	PLCC	65	IC10
N82S130AA	A	20	PLCC	65	IC10
N82S130AD	DJ	16	SO16	65	–
N82S130AN	NJ	16	PLDIL	65	IC10
N82S130F	FJ	16	CERDIP	65	–
N82S130N	NJ	16	PLDIL	65	IC10
N82S131A	A	20	PLCC	65	IC10
N82S131AA	A	20	PLCC	65	IC10
N82S131AD	DJ	16	SO16	65	–
N82S131AF	FJ	16	CERDIP	65	–
N82S131AN	NJ	16	PLDIL	65	IC10
N82S131F	FJ	16	CERDIP	65	–
N82S131N	NJ	16	PLDIL	65	IC10
N82S135A	A	20	PLCC	65	IC10
N82S135N	NL	20	PLDIL	65	IC10
N82S137A	A	20	PLCC	65	IC10
N82S137AA	A	20	PLCC	65	IC10
N82S137AF	FK	18	CERDIP	65	–
N82S137AN	NK	18	PLDIL	65	IC10
N82S137BA	A	20	PLCC	65	IC10
N82S137BN	NK	18	PLDIL	65	IC10
N82S137CA	A	20	PLCC	65	IC10
N82S137CN	N	18	PLDIL	65	IC10
N82S137F	FK	18	CERDIP	65	–
N82S137N	NK	18	PLDIL	65	IC10
N82S141AN	N	24	PLDIL	65	IC10
N82S141AN3	N	24	PLDIL	65	IC10
N82S141F	FN	24	CERDIP	65	–
N82S141N	NN	24	PLDIL	65	IC10
N82S141N3	N	24	PLDIL	65	IC10
N82S147A	A	20	PLCC	65	IC10
N82S147AA	A	20	PLCC	65	IC10
N82S147AF	FL	20	CERDIP	65	–
N82S147AN	NL	20	PLDIL	65	IC10
N82S147BA	A	20	PLCC	65	IC10
N82S147BN	N	20	PLDIL	65	IC10
N82S147F	FL	20	CERDIP	65	–
N82S147N	NL	20	PLDIL	65	IC10
N82S16D	D	16	SO16	66	IC10
N82S16F	FJ	16	CERDIP	66	–
N82S16N	NJ	16	PLDIL	66	IC10

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N82S181A	A	28	PLCC	65	IC10
N82S181AA	AQ	28	PLCC	65	IC10
N82S181AF	FN	24	CERDIP	65	–
N82S181AN	NN	24	PLDIL	65	IC10
N82S181CA	A	28	PLCC	65	IC10
N82S181CF	FN	24	CERDIP	65	–
N82S181CF3	FN	24	CERDIP	65	–
N82S181CN	NN	24	PLDIL	65	IC10
N82S181CN3	NN	24	PLDIL	65	IC10
N82S181F	FN	24	CERDIP	65	–
N82S181N	NN	24	PLDIL	65	IC10
N82S183F	FN	24	CERDIP	65	–
N82S183N	NN	24	PLDIL	65	IC10
N82S185AF	FK	18	CERDIP	65	–
N82S185AN	NK	18	PLDIL	65	IC10
N82S185CN	N	18	PLDIL	65	IC10
N82S185F	FK	18	CERDIP	65	–
N82S185N	NK	18	PLDIL	65	IC10
N82S19A	A	28	PLCC	66	IC10
N82S19F	FQ	28	CERDIP	66	–
N82S19N	NQ	28	PLDIL	66	IC10
N82S191A	A	28	PLCC	65	IC10
N82S191AA	A	28	PLCC	65	IC10
N82S191AF	FN	24	CERDIP	65	–
N82S191AN	NN	24	PLDIL	65	IC10
N82S191CA	A	28	PLCC	65	IC10
N82S191CF	FN	24	CERDIP	65	–
N82S191CF3	FN	24	CERDIP	65	–
N82S191CN	NN	24	PLDIL	65	IC10
N82S191CN3	NN	24	PLDIL	65	IC10
N82S191F	FN	24	CERDIP	65	–
N82S191N	NN	24	PLDIL	65	IC10
N82S212A	A	28	PLCC	66	IC10
N82S212AA	A	28	PLCC	66	IC10
N82S212AF	FM	22	CERDIP	66	–
N82S212AN	NM	22	PLDIL	66	IC10
N82S212F	FM	22	CERDIP	66	–
N82S212N	NM	22	PLDIL	66	IC10
N82S23A	A	20	PLCC	65	IC10
N82S23AA	A	20	PLCC	65	IC10
N82S23AD	DJ	16	SO16	65	–
N82S23AN	NJ	16	PLDIL	65	IC10
N82S23F	FJ	16	CERDIP	65	–
N82S23N	NJ	16	PLDIL	65	IC10
N82S25D	D	16	SO16	66	IC10
N82S25F	FJ	16	CERDIP	66	–
N82S25N	NJ	16	PLDIL	66	IC10
N82US123A	A	20	PLCC	66	IC10
N82US123N	N	16	PLDIL	66	IC10
N82US23A	A	20	PLCC	66	IC10
N82US23N	N	16	PLDIL	66	IC10
N8234N	NJ	16	PLDIL	63	–
N8242N	NH	14	PLDIL	62	–
N8262N	NH	14	PLDIL	62	–
N8266N	NJ	16	PLDIL	63	–
N8271N	NJ	16	PLDIL	63	–
N8273N	NJ	16	PLDIL	63	–

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N8274N	NJ	16	PLDIL	63	–
N8881N	NH	14	PLDIL	62	–
N9309N	NJ	16	PLDIL	63	–
N9324N	NJ	16	PLDIL	62	–
N9334N	NJ	16	PLDIL	62	–
N9401N	NH	14	PLDIL	67;92	IC09 IC19
N9403N	NN	24	PLDIL	67	IC09
N9602N	NJ	16	PLDIL	63	–
OM200/S2	SOT20	4	SIL	94	IC01
OM8000	PC–board	–	–	72;104;111	–
OM8200	PC–board	–	–	72;104;111	IC01 IC03 IC17
OM8201	PC–board	–	–	104;111	IC01 IC03 IC17
OM8209	PC–board	–	–	72;104;111	–
OM8210	PC–board	–	–	72;104;111	IC01 IC03 IC17
PCA1201T	SOT144	8	MFP	89	IC16
PCA1201U	–	8	PADS	89	IC16
PCA1203T	SOT144	8	MFP	89	IC16
PCA1203U	–	8	PADS	89	IC16
PCA1204T	SOT144	8	MFP	89	IC16
PCA1204U	–	8	PADS	89	IC16
PCA1205T	SOT144	8	MFP	89	IC16
PCA1205U	–	8	PADS	89	IC16
PCA1207T	SOT144	8	MFP	89	IC16
PCA1207U	–	8	PADS	89	IC16
PCA1209T	SOT144	8	MFP	89	IC16
PCA1209U	–	8	PADS	89	IC16
PCA1212T	SOT144	8	MFP	89	IC16
PCA1212U	–	8	PADS	89	IC16
PCA1243T	SOT144	8	MFP	89	IC16
PCA1243U	–	8	PADS	89	IC16
PCA1246T	SOT144	8	MFP	89	IC16
PCA1246U	–	8	PADS	89	IC16
PCA1247T	SOT144	8	MFP	89	IC16
PCA1247U	–	8	PADS	89	IC16
PCA1248T	SOT144	8	MFP	89	IC16
PCA1248U	–	8	PADS	89	IC16
PCA1249T	SOT144	8	MFP	89	IC16
PCA1249U	–	8	PADS	89	IC16
PCA1260T	SOT144	8	MFP	89	IC16
PCA1260U	–	8	PADS	89	IC16
PCA1261T	SOT144	8	MFP	89	IC16
PCA1261U	–	8	PADS	89	IC16
PCA1401T	SOT144	8	MFP	89	IC16
PCA1401U	–	8	PADS	89	IC16
PCA1403T	SOT144	8	MFP	89	IC16
PCA1403U	–	8	PADS	89	IC16
PCA1404T	SOT144	8	MFP	89	IC16
PCA1404U	–	8	PADS	89	IC16
PCA1408T	SOT144	8	MFP	89	IC16
PCA1408U	–	8	PADS	89	IC16

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PCA1409T	SOT144	8	MFP	89	IC16
PCA1409U	–	8	PADS	89	IC16
PCA1411T	SOT144	8	MFP	90	IC16
PCA1411U	–	8	PADS	90	IC16
PCA1412T	SOT144	8	MFP	90	IC16
PCA1412U	–	8	PADS	90	IC16
PCA1426T	SOT144	8	MFP	90	IC16
PCA1426U	–	8	PADS	90	IC16
PCA1446T	SOT144	8	MFP	90	IC16
PCA1446U	–	8	PADS	90	IC16
PCA1449T	SOT144	8	MFP	90	IC16
PCA1449U	–	8	PADS	90	IC16
PCA1460T	SOT144	8	MFP	90	IC16
PCA1460U	–	8	PADS	90	IC16
PCA1461T	SOT144	8	MFP	90	IC16
PCA1461U	–	8	PADS	90	IC16
PCA1462T	SOT144	8	MFP	90	IC16
PCA1462U	–	8	PADS	90	IC16
PCA1463T	SOT144	8	MFP	90	IC16
PCA1463U	–	8	PADS	90	IC16
PCA1512P	SOT97A	8	DIL	89	IC16
PCA1517P	SOT97A	8	DIL	89	IC16
PCA1584P	SOT97A	8	DIL	89	IC16
PCA1584T	SOT96C	8	SO8	89	IC16
PCA1585P	SOT97A	8	DIL	89	IC16
PCA1585T	SOT96C	8	SO8	89	IC16
PCA1586P	SOT97A	8	DIL	89	IC16
PCA1586T	SOT96C	8	SO8	89	IC16
PCA1587P	SOT97A	8	DIL	89	IC16
PCA1587T	SOT96C	8	SO8	89	IC16
PCA1590P	SOT97A	8	DIL	89	–
PCA1590T	SOT96C	8	SO8	89	–
PCA1590U/10	–	8	FFC	89	–
PCA5000T	SOT136A	28	SO28	112	IC17
PCA80C31BH–3P	SOT129	40	DIL	67;100;120	DS
PCA80C31BH–3WP	SOT187AA	44	PLCC	67;100;120	DS
PCA80C39P	SOT129	40	DIL	67;100	–
PCA80C39WP	SOT187AA	44	PLCC	67;100	–
PCA80C49P	SOT129	40	DIL	67;100	–
PCA80C49WP	SOT187AA	44	PLCC	67;100	–
PCA80C51BH–3P	SOT129	40	DIL	67;100;120	DS
PCA80C51BH–3WP	SOT187AA	44	PLCC	67;100;120	DS
PCA80C552WP	SOT188AA	68	PLCC	67;98;100;116;120	DS
PCA80C562WP	SOT188AA	68	PLCC	67	–
PCA80C652P	SOT129		DIL	67;98;100;116;120	DS
PCA80C652WP	SOT187AA		PLCC	67;98;100;116;120	DS
PCA83C552WP	SOT188AA	68	PLCC	67;98;100;116;120	DS
PCA83C562WP	SOT188AA	68	PLCC	68	–
PCA83C652P	SOT129	40	DIL	68;98;100;117;120	DS
PCA83C652WP	SOT187AA	44	PLCC	68;98;100;117;120	DS
PCA83C654P	SOT129	40	DIL	68;98;100;117;120	IC02
PCA83C654WP	SOT187AA	44	PLCC	68;98;100;117;120	IC02
PCB2310WP	SOT187	44	PLCC	74;91;111	IC17
PCB2320P	SOT117	28	DIL	91;111	–
PCB2390	–	–	–	74;91;111	IC17
PCB5010WP–8	SOT188AA	68	PLCC	64;112	DS
PCB5011YC–8	–	144	PGA	64;112	DS

extended type no.	package code	no. of pins	pin position	catalogue page no.	handbook
PCB80C31BH–3P	SOT129	40	DIL	68;100;120	DS
PCB80C31BH–3WP	SOT187AA	44	PLCC	68;100;120	DS
PCB80C39P	SOT129	40	DIL	68;100;120	IC14
PCB80C39WP	SOT187AA	44	PLCC	68;100;120	IC14
PCB80C49P	SOT129	40	DIL	68;100;120	IC14
PCB80C49WP	SOT187AA	44	PLCC	68;100;120	IC14
PCB80C51BH–3P	SOT129	40	DIL	68;101;120	DS
PCB80C51BH–3WP	SOT187AA	44	PLCC	68;101;120	DS
PCB80C552WP	SOT188AA	68	PLCC	68;98;101;107; 109;110;117;120	DS
PCB80C562WP	SOT188AA	68	PLCC	68	–
PCB80C652P	SOT129	40	DIL	68;98;101;107; 109;110;120	DS
PCB80C652WP	SOT187AA	44	PLCC	68;98;101;107; 109;110;120	DS
PCB80C851P	SOT129	40	DIL	68;109;110	–
PCB80C851WP	SOT187AA	44	PLCC	68;109;110	–
PCB83C552WP	SOT188AA	68	PLCC	68;98;101;117;120	DS
PCB83C562WP	SOT188AA	68	PLCC	68	–
PCB83C652P	SOT129	40	DIL	68;99;101;107; 111;117;120	DS
PCB83C652WP	SOT187AA	44	PLCC	68;99;101;107; 111;117;120	DS
PCB83C654P	SOT129	40	DIL	68;99;101;117;120	IC02
PCB83C654WP	SOT187AA	44	PLCC	68;99;101;117;120	IC02
PCB83C851P	SOT129	40	DIL	68;109;110	–
PCB83C851WP	SOT187AA	44	PLCC	68;109;110	–
PCC0800	–	–	–	130	–
PCC1500	–	–	–	130	–
PCC2400	–	–	–	130	–
PCD3300B		28	PB	109	–
PCD3310AP	SOT146	28	DIL	107	IC03
PCD3310AT	SOT136A	28	SO28	107	IC03 IC12 IC17
PCD3310CP	SOT146	20	DIL	107	IC03
PCD3310CT	SOT136A	28	SO28	107	IC03
PCD3310P	SOT146	20	DIL	106	IC03
PCD3310T	SOT136A	28	SO	106	IC03
PCD3311AT	SOT162A	16	SO16L	106;108;110	IC03
PCD3311P	SOT27	14	DIL	106;108	IC03 IC12 IC17
PCD3311T	SOT162A	16	SO16L	106;108	IC03 IC12 IC17
PCD3312P	SOT97	8	DIL	106;108;110	IC03 IC12 IC17
PCD3312T	SOT176	8	SO8L	106;108;110	IC03 IC12 IC17
PCD3315/502P	SOT117	28	DIL	107;110	–
PCD3315/502T	SOT136A	28	SO28	107;110	–
PCD3315/503P	SOT117	28	DIL	107	IC03
PCD3315/503T	SOT136A	28	SO28	107	IC03
PCD3315/512P	SOT117	28	DIL	107	–

extended type no.	package code	no. of pins	pin position	catalogue page no.	handbook
PCD3315/512T	SOT136A	28	SO28	107	–
PCD3315/513P	SOT117	28	DIL	107	–
PCD3315/513T	SOT136A	28	SO28	107	–
PCD3315/534P	SOT117		DIL	111	–
PCD3315/534T	SOT136A		SO28	111	–
PCD3315CP	SOT117	28	DIL	68;108;109	IC03 IC12
PCD3315CT	SOT136A	28	SO28	68;108;109	IC03 IC12
PCD3320CD	SOT133B	18	CERDIP	106	DS
PCD3320CP	SOT102G	18	DIL	106	DS
PCD3321CD	SOT133B	18	CERDIP	106	DS
PCD3321CP	SOT102G	18	DIL	106	DS
PCD3321CT	SOT163A	20	SO20	106	DS
PCD3322CP	SOT102G	18	DIL	106	DS
PCD3322CT	SOT163A	20	SO20	106	DS
PCD3323D	SOT135A	28	DIL	106	IC03
PCD3323P	SOT117	28	DIL	106	IC03
PCD3323T	SOT136A	28	SO28	106	IC03
PCD3324CP	SOT102G	18	DIL	106	DS
PCD3325CP	SOT102G	18	DIL	106	DS
PCD3326CP	SOT102G	18	DIL	106	DS
PCD3327CP	SOT102G	18	DIL	106	DS
PCD3327CT	SOT163A	20	SO20	106	DS
PCD3327CU		20	PADS	106	DS
PCD3341P	SOT117	18	DIL	107;108	IC03
PCD3341T	SOT136A	28	SO28	107;108	IC03
PCD3343D	SOT135A	28	DIL	68;108;109	IC03 IC12
PCD3343P	SOT117	28	DIL	68;108;109	IC03 IC12
PCD3343T	SOT136A	28	SO28	68;108;109	IC03 IC12
PCD3344/004P	SOT117	28	DIL	107	–
PCD3344/004T	SOT136A	28	SO28	107	–
PCD3344/006P	SOT117	28	DIL	107	–
PCD3344/006T	SOT136A	28	SO28	107	–
PCD3344B		28	PB	108;109	–
PCD3344P	SOT117	28	DIL	108;109;111	IC03
PCD3344T	SOT136A	28	SO28	108;109;111	IC03
PCD3346P	SOT117	28	DIL	108;109	–
PCD3346T	SOT136A	28	SO28	108;109	–
PCD3347P	SOT146	20	DIL	108;109	IC03
PCD3347T	SOT163A	20	SO20	108;109	IC03
PCD3348P	SOT117	28	DIL	68;108;109	–
PCD3348T	SOT136A	28	SO28	68;108;109	–
PCD3349P	SOT117	28	DIL	108;109	IC03
PCD3349T	SOT136A	28	SO28	108;109	IC03
PCD3360P	SOT38	16	DIL	111	IC03
PCD3360T	SOT162A	16	SO16L	111	IC03
PCD4410	SOT102	18	DIL	107	DS
PCD4413	SOT102	18	DIL	107	IC03
PCD4413A	SOT102	18	DIL	107	–
PCD4415AP	SOT102	18	DIL	107	–
PCD4415AT	SOT163A	20	SO20	107	–
PCD4415P	SOT102	18	DIL	107	IC03
PCD4415T	SOT163A	20	SO20	107	IC03

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PCD5101P	SOT116	22	DIL	66	IC10
PCD5101T	SOT137A	24	SO24	66	IC10
PCD5114D	SOT133	18	DIL	66	IC10
PCD5114P	SOT102G	18	DIL	66	IC10
PCD5114T	SOT163A	20	SO20	66	IC10
PCF0800	–	–	–	130	–
PCF1171BT	SOT158B	40	VSO40	90	IC16
PCF1171U	uncased	40	PADS	90	IC16
PCF1172BT	SOT158B	40	VSO40	90	IC16
PCF1172U	uncased	40	PADS	90	IC16
PCF1174BT	SOT158B	40	VSO40	90	DS
PCF1174U	uncased	40	PADS	90	DS
PCF1175T	SOT136A	28	SO28	90	DS
PCF1175U	uncased	28	PADS	90	DS
PCF1175U/10		28	FFC	90	DS
PCF1176BT	SOT158B	40	VSO40	90	DS
PCF1176U	uncased	40	PADS	90	DS
PCF1178T	SOT136A	28	SO28	90	DS
PCF1178U	uncased	28	PADS	90	DS
PCF1178U/10		28	FFC	90	DS
PCF1178U/5			UW	90	DS
PCF1303T	SOT136A	28	SO28	96;115	IC01 IC02
PCF1500	–	–	–	130	–
PCF2100P	SOT117	28	DIL	72;96;115	IC01 IC02
PCF2100T	SOT136A	28	SO28	72;96;115	IC01 IC02 IC03 IC17
PCF2110P	SOT129	40	DIL	72;96;115	IC01 IC02 IC03 IC17
PCF2110T	SOT158A	40	VSO40	72;96;115	IC01 IC02 IC03 IC17
PCF2111P	SOT129	40	DIL	72;96;107;115	IC01 IC02 IC03 IC17
PCF2111T	SOT158A	40	VSO40	72;96;107;115	IC01 IC02 IC03 IC17
PCF2112P	SOT129	40	DIL	72;96;115	IC01 IC02 IC03 IC17
PCF2112T	SOT158A	40	VSO40	72;96;115	IC01 IC02 IC03 IC17
PCF2201V	–	120	TAB	72;96;107;115	IC01 IC02
PCF2400	–	–	–	130	–

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PCF3016	–	–	–	131	–
PCF3025	–	–	–	131	–
PCF3035	–	–	–	131	–
PCF3046	–	–	–	131	–
PCF3064	–	–	–	131	–
PCF3090	–	–	–	131	–
PCF3127	–	–	–	131	–
PCF4420P	SOT38	16	DIL	106	–
PCF4420T	SOT162A	16	SO16L	106	–
PCF4421P	SOT102	18	DIL	106	–
PCF4421T	SOT163A	20	SO20	106	–
PCF5010WP–8	SOT188A	68	PLCC	64;112	DS
PCF5011YC–8	–	144	PGA	64;112	DS
PCF5022WP	SOT187A	44	PLCC	95	DS
PCF5023WP	SOT187A	44	PLCC	95	DS
PCF80C31BH–3P	SOT129	40	DIL	68;101;120	DS
PCF80C31BH–3WP	SOT187AA	44	PLCC	68;101;120	DS
PCF80C39P	SOT129	40	DIL	68;101;120	IC14
PCF80C39WP	SOT187AA	44	PLCC	68;101;120	IC14
PCF80C49P	SOT129	40	DIL	68;101;120	IC14
PCF80C49WP	SOT187AA	44	PLCC	68;101;120	IC14
PCF80C51BH–3P	SOT129	40	DIL	68;101;120	DS
PCF80C51BH–3WP	SOT187AA	44	PLCC	68;101;120	DS
PCF80C552WP	SOT188AA	68	PLCC	69;99;101;117;120	–
PCF80C562WP	SOT188AA	68	PLCC	69	–
PCF80C652P	SOT129		DIL	69;99;101;117;121	DS
PCF80C652WP	SOT187AA		PLCC	69;99;101;117;121	DS
PCF80C851P	SOT129	40	DIL	69;110	–
PCF80C851WP	SOT187AA	44	PLCC	69;110	–
PCF8200	SOT101A	24	DIL	72;99;104;108;111	IC01 IC03 IC12 IC17
PCF83C552WP	SOT188AA	68	PLCC	69;99;101;117;121	–
PCF83C562WP	SOT188AA	68	PLCC	69	–
PCF83C652P	SOT129	40	DIL	69;99;101;117;121	DS
PCF83C652WP	SOT187AA	44	PLCC	69;99;101;117;121	DS
PCF83C654P	SOT129	40	DIL	69;99;101;117;121	–
PCF83C654WP	SOT187AA	44	PLCC	69;99;101;117;121	–
PCF83C851P	SOT129	40	DIL	69;110	–
PCF83C851WP	SOT187AA	44	PLCC	69;110	–
PCF84C00B	–	28	PB	69;101;117	DS
PCF84C00T	SOT190	56	VSO56	69;101;117	DS
PCF84C12P	SOT146	20	DIL	69;101;117	DS
PCF84C12T	SOT163A	20	SO20	69;101;117	DS
PCF84C121P	SOT146	20	DIL	69	DS
PCF84C121T	SOT163A	20	SO20	69	DS
PCF84C21P	SOT117	28	DIL	69;101;117	DS
PCF84C21T	SOT136A	28	SO28	69;101;117	DS
PCF84C22P	SOT146	20	DIL	69	DS
PCF84C22T	SOT163A	20	SO20	69	DS
PCF84C230P	SOT129	40	DIL	69	–
PCF84C230T	SOT158A	40	VSO40	69	–
PCF84C270P	SOT129	40	DIL	69	DS
PCF84C271P	SOT129	40	DIL	69	DS
PCF84C41P	SOT117	28	DIL	69;101;117	DS
PCF84C41T	SOT136A	28	SO28	69;101;117	DS

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PCF84C42P	SOT146	20	DIL	69	DS
PCF84C42T	SOT163A	20	SO20	69	DS
PCF84C430H	SOT208	64	QFP	69	DS
PCF84C470P	SOT129	40	DIL	69	–
PCF84C633T	SOT190	56	VSO56	69	–
PCF84C81P	SOT117	28	DIL	69;101;117	DS
PCF84C81T	SOT136A	28	SO28	69;101;117	DS
PCF84C85P	SOT129	40	DIL	69;101;117	DS
PCF84C85T	SOT158A	40	VSO40	69;101;117	DS
PCF84C853P	SOT129	40	DIL	69	–
PCF84C853T	SOT158A	40	VSO40	69	–
PCF8566P	SOT129	40	DIL	72;96;99;107;108;115;117	IC01 IC02 IC03 IC12 IC14 IC17
PCF8566T	SOT158A	40	VSO40	72;96;99;107;108;115;117	IC01 IC02 IC03 IC12 IC14 IC17
PCF8570CP	SOT97	8	DIL	66	IC02 IC03 IC12 IC17
PCF8570CT	SOT176	8	SO8L	66	IC02 IC03 IC12 IC17
PCF8570P	SOT97	8	DIL	66;72;99;100;108;109;117;119	IC02 IC03 IC12 IC14 IC17
PCF8570T	SOT176	8	SO8L	66;72;99;100;108;109;117;119	IC02 IC03 IC12 IC14 IC17
PCF8571P	SOT97	8	DIL	66;72;99;100;108;109;117;119	IC02 IC03 IC12 IC14 IC17
PCF8571T	SOT176	8	SO8L	66;72;99;100;108;109;117;119	IC02 IC03 IC12 IC14 IC17
PCF8573P	SOT38	16	DIL	72;95;99;106;108;113;117	IC01 IC02 IC03 IC12 IC14 IC17

extended type no.	package code	no. of pins	pin position	catalogue page no.	handbook
PCF8573T	SOT162A	16	SO16L	72;95;99;106;108;113;117	IC01 IC02 IC03 IC12 IC14 IC17
PCF8574AP	SOT38	16	DIL	72;83;99;104;108;111;124	IC01 IC02 IC03 IC12 IC17
PCF8574AT	SOT162A	16	SO16L	72;83;99;104;108;111;124	IC01 IC02 IC03 IC12 IC17
PCF8574P	SOT38	16	DIL	72;83;99;104;108;111;117;124	IC01 IC02 IC03 IC12 IC14 IC17
PCF8574T	SOT162A	16	SO16L	72;83;99;104;108;111;117;124	IC01 IC02 IC03 IC12 IC14 IC17
PCF8576T	SOT190	56	VSO56	72;96;99;107;108;115;117	IC02 IC03 IC12 IC14 IC17
PCF8576U	–	56	PADS	72;96;99;107;108;115;117	IC02 IC03 IC12 IC14 IC17
PCF8576U/10	–	56	FFC	72;96;99;107;108;115;117	IC02 IC03 IC12 IC14 IC17
PCF8577AP	SOT129	40	DIL	72;96;99;107;108;115	IC01 IC02 IC03 IC12 IC14 IC17
PCF8577AT	SOT158A	40	VSO40	72;96;99;107;108;115	IC01 IC02 IC03 IC12 IC14 IC17
PCF8577P	SOT129	40	DIL	72;96;99;107;108;115;117	IC01 IC02

extended type no.	package code	no. of pins	pin position	catalogue page no.	handbook
PCF8577P	SOT129	40	DIL	72;96;99;107;108;115;117	IC03 IC12 IC14 IC17
PCF8577T	SOT158A	40	VSO40	72;96;99;107;108;115;117	IC01 IC02 IC03 IC12 IC14 IC17
PCF8578T	SOT190	56	VSO56	72;96;99;107;115;117	IC03 IC12 IC17
PCF8578U	–	56	PADS	72;96;99;107;115;117	IC03 IC12 IC17
PCF8579T	SOT190	56	VSO56	72;96;99;107;115;117	IC03 IC12 IC17
PCF8579U	–	56	PADS	72;96;99;107;115;117	IC03 IC12 IC17
PCF8582AP	SOT97	8	DIL	65;72;99;100;108;109;117;119	IC03 IC17
PCF8582AT	SOT162A	16	SO16L	65;72;99;100;108;109;117;119	IC03 IC17
PCF8583P	SOT97	8	DIL	66;73;95;99;106;113;118;119	IC01 IC02 IC03 IC10 IC12 IC14 IC17
PCF8583T	SOT176	8	SO8L	66;73;95;99;106;113;118;119	IC01 IC02 IC03 IC10 IC12 IC14 IC17
PCF8591P	SOT38	16	DIL	73;80;95;99;106;108;110;114;118	IC01 IC02 IC03 IC12 IC14 IC17
PCF8591T	SOT162A	16	SO16L	73;80;95;99;106;108;110;114;118	IC01 IC02 IC03 IC12 IC14 IC17
PC74HCT00P	SOT27	14	DIL	26	IC06
PC74HCT00T	SOT108A	14	SO14	26	IC06
PC74HCT02P	SOT27	14	DIL	26	IC06
PC74HCT02T	SOT108A	14	SO14	26	IC06
PC74HCT03P	SOT27	14	DIL	26	IC06

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extended type no.	package code	no. of pins	pin position	catalogue page no.	handbook
PC74HCT03T	SOT108A	14	SO14	26	IC06
PC74HCT04P	SOT27	14	DIL	26	IC06
PC74HCT04T	SOT108A	14	SO14	26	IC06
PC74HCT08P	SOT27	14	DIL	26	IC06
PC74HCT08T	SOT108A	14	SO14	26	IC06
PC74HCT10P	SOT27	14	DIL	26	IC06
PC74HCT10T	SOT108A	14	SO14	26	IC06
PC74HCT107P	SOT27	14	DIL	26	IC06
PC74HCT107T	SOT108A	14	SO14	26	IC06
PC74HCT109P	SOT38Z	16	DIL	26	IC06
PC74HCT109T	SOT109A	16	SO16	26	IC06
PC74HCT11P	SOT27	14	DIL	26	IC06
PC74HCT11T	SOT108A	14	SO14	26	IC06
PC74HCT112P	SOT38Z	16	DIL	26	IC06
PC74HCT112T	SOT109A	16	SO16	26	IC06
PC74HCT123P	SOT38Z	16	DIL	27	IC06
PC74HCT123T	SOT109A	16	SO16	27	IC06
PC74HCT125P	SOT27	14	DIL	23	IC06
PC74HCT125T	SOT108A	14	SO14	23	IC06
PC74HCT126P	SOT27	14	DIL	23	IC06
PC74HCT126T	SOT108A	14	SO14	23	IC06
PC74HCT132P	SOT27	14	DIL	28	IC06
PC74HCT132T	SOT108A	14	SO14	28	IC06
PC74HCT137P	SOT38Z	16	DIL	24	IC06
PC74HCT137T	SOT109A	16	SO16	24	IC06
PC74HCT138P	SOT38Z	16	DIL	24	IC06
PC74HCT138T	SOT109A	16	SO16	24	IC06
PC74HCT139P	SOT38Z	16	DIL	24	IC06
PC74HCT139T	SOT109A	16	SO16	24	IC06
PC74HCT14P	SOT27	14	DIL	28	IC06
PC74HCT14T	SOT108A	14	SO14	28	IC06
PC74HCT147P	SOT38Z	16	DIL	25	IC06
PC74HCT147T	SOT109A	16	SO16	25	IC06
PC74HCT151P	SOT38Z	16	DIL	27	IC06
PC74HCT151T	SOT109A	16	SO16	27	IC06
PC74HCT153P	SOT38Z	16	DIL	27	IC06
PC74HCT153T	SOT109A	16	SO16	27	IC06
PC74HCT154P	SOT101A	24	DIL	24	IC06
PC74HCT154T	SOT137A	24	SO24	24	IC06
PC74HCT157P	SOT38Z	16	DIL	27	IC06
PC74HCT157T	SOT109A	16	SO16	27	IC06
PC74HCT158P	SOT38Z	16	DIL	27	IC06
PC74HCT158T	SOT109A	16	SO16	27	IC06
PC74HCT160P	SOT38Z	16	DIL	24	IC06
PC74HCT160T	SOT109A	16	SO16	24	IC06
PC74HCT161P	SOT38Z	16	DIL	24	IC06
PC74HCT161T	SOT109A	16	SO16	24	IC06
PC74HCT162P	SOT38Z	16	DIL	24	IC06
PC74HCT162T	SOT109A	16	SO16	24	IC06
PC74HCT163P	SOT38Z	16	DIL	24	IC06
PC74HCT163T	SOT109A	16	SO16	24	IC06
PC74HCT164P	SOT27	14	DIL	27	IC06
PC74HCT164T	SOT108A	14	SO14	27	IC06
PC74HCT165P	SOT38Z	16	DIL	27	IC06
PC74HCT165T	SOT109A	16	SO16	27	IC06
PC74HCT166P	SOT38Z	16	DIL	27	IC06
PC74HCT166T	SOT109A	16	SO16	27	IC06

extended type no.	package code	no. of pins	pin position	catalogue page no.	handbook
PC74HCT173P	SOT38Z	16	DIL	25	IC06
PC74HCT173T	SOT109A	16	SO16	25	IC06
PC74HCT174P	SOT38Z	16	DIL	25	IC06
PC74HCT174T	SOT109A	16	SO16	25	IC06
PC74HCT175P	SOT38Z	16	DIL	25	IC06
PC74HCT175T	SOT109A	16	SO16	25	IC06
PC74HCT181P	SOT101A	24	DIL	23	IC06
PC74HCT181T	SOT137A	24	SO24	23	IC06
PC74HCT182P	SOT38Z	16	DIL	23	IC06
PC74HCT182T	SOT109A	16	SO16	23	IC06
PC74HCT190P	SOT38Z	16	DIL	24	IC06
PC74HCT190T	SOT109A	16	SO16	24	IC06
PC74HCT191P	SOT38Z	16	DIL	24	IC06
PC74HCT191T	SOT109A	16	SO16	24	IC06
PC74HCT192P	SOT38Z	16	DIL	24	IC06
PC74HCT192T	SOT109A	16	SO16	24	IC06
PC74HCT193P	SOT38Z	16	DIL	24	IC06
PC74HCT193T	SOT109A	16	SO16	24	IC06
PC74HCT194P	SOT38Z	16	DIL	28	IC06
PC74HCT194T	SOT109A	16	SO16	28	IC06
PC74HCT195P	SOT38Z	16	DIL	28	IC06
PC74HCT195T	SOT109A	16	SO16	28	IC06
PC74HCT20P	SOT27	14	DIL	26	IC06
PC74HCT20T	SOT108A	14	SO14	26	IC06
PC74HCT21P	SOT27	14	DIL	26	IC06
PC74HCT21T	SOT108A	14	SO14	26	IC06
PC74HCT221P	SOT38Z	16	DIL	27	IC06
PC74HCT221T	SOT109A	16	SO16	27	IC06
PC74HCT237P	SOT38Z	16	DIL	24	IC06
PC74HCT237T	SOT109A	16	SO16	24	IC06
PC74HCT238P	SOT38Z	16	DIL	24	IC06
PC74HCT238T	SOT109A	16	SO16	24	IC06
PC74HCT240P	SOT146	20	DIL	23	IC06
PC74HCT240T	SOT163A	20	SO20	23	IC06
PC74HCT241P	SOT146	20	DIL	23	IC06
PC74HCT241T	SOT163A	20	SO20	23	IC06
PC74HCT242P	SOT27	14	DIL	23;28	IC06
PC74HCT242T	SOT108A	14	SO14	23;28	IC06
PC74HCT243P	SOT27	14	DIL	23;28	IC06
PC74HCT243T	SOT108A	14	SO14	23;28	IC06
PC74HCT244P	SOT146	20	DIL	23	IC06
PC74HCT244T	SOT163A	20	SO20	23	IC06
PC74HCT245P	SOT146	20	DIL	23;28	IC06
PC74HCT245T	SOT163A	20	SO20	23;28	IC06
PC74HCT251P	SOT38Z	16	DIL	27	IC06
PC74HCT251T	SOT109A	16	SO16	27	IC06
PC74HCT253P	SOT38Z	16	DIL	27	IC06
PC74HCT253T	SOT109A	16	SO16	27	IC06
PC74HCT257P	SOT38Z	16	DIL	27	IC06
PC74HCT257T	SOT109A	16	SO16	27	IC06
PC74HCT258P	SOT38Z	16	DIL	27	IC06
PC74HCT258T	SOT109A	16	SO16	27	IC06
PC74HCT259P	SOT38Z	16	DIL	27	IC06
PC74HCT259T	SOT109A	16	SO16	27	IC06
PC74HCT27P	SOT27	14	DIL	26	IC06
PC74HCT27T	SOT108A	14	SO14	26	IC06
PC74HCT273P	SOT146	20	DIL	25	IC06

extended type no.	package code	no. of pins	pin position	catalogue page no.	handbook
PC74HCT273T	SOT163A	20	SO20	25	IC06
PC74HCT280P	SOT27	14	DIL	23	IC06
PC74HCT280T	SOT108A	14	SO14	23	IC06
PC74HCT283P	SOT38Z	16	DIL	23	IC06
PC74HCT283T	SOT109A	16	SO16	23	IC06
PC74HCT297P	SOT38Z	16	DIL	28	IC06
PC74HCT297T	SOT109A	16	SO16	28	IC06
PC74HCT299P	SOT146	20	DIL	28	IC06
PC74HCT299T	SOT163A	20	SO20	28	IC06
PC74HCT30P	SOT27	14	DIL	26	IC06
PC74HCT30T	SOT108A	14	SO14	26	IC06
PC74HCT32P	SOT27	14	DIL	26	IC06
PC74HCT32T	SOT108A	14	SO14	26	IC06
PC74HCT354P	SOT146	20	DIL	27;28	IC06
PC74HCT354T	SOT163A	20	SO20	27;28	IC06
PC74HCT356P	SOT146	20	DIL	27;28	IC06
PC74HCT356T	SOT163A	20	SO20	27;28	IC06
PC74HCT365P	SOT38Z	16	DIL	23	IC06
PC74HCT365T	SOT109A	16	SO16	23	IC06
PC74HCT366P	SOT38Z	16	DIL	23	IC06
PC74HCT366T	SOT109A	16	SO16	23	IC06
PC74HCT367P	SOT38Z	16	DIL	23	IC06
PC74HCT367T	SOT109A	16	SO16	23	IC06
PC74HCT368P	SOT38Z	16	DIL	23	IC06
PC74HCT368T	SOT109A	16	SO16	23	IC06
PC74HCT373P	SOT146	20	DIL	25	IC06
PC74HCT373T	SOT163A	20	SO20	25	IC06
PC74HCT374P	SOT146	20	DIL	25	IC06
PC74HCT374T	SOT163A	20	SO20	25	IC06
PC74HCT377P	SOT146	20	DIL	25	IC06
PC74HCT377T	SOT163A	20	SO20	25	IC06
PC74HCT390P	SOT38Z	16	DIL	24	IC06
PC74HCT390T	SOT109A	16	SO16	24	IC06
PC74HCT393P	SOT38Z	16	DIL	24	IC06
PC74HCT393T	SOT109A	16	SO16	24	IC06
PC74HCT4002P	SOT27	14	DIL	26	IC06
PC74HCT4002T	SOT108A	14	SO14	26	IC06
PC74HCT40102P	SOT38Z	16	DIL	24	IC06
PC74HCT40102T	SOT109A	16	SO16	24	IC06
PC74HCT40103P	SOT38Z	16	DIL	24	IC06
PC74HCT40103T	SOT109A	16	SO16	24	IC06
PC74HCT40104P	SOT38Z	16	DIL	28	IC06
PC74HCT40104T	SOT109A	16	SO16	28	IC06
PC74HCT40105P	SOT38Z	16	DIL	28;91	IC06
PC74HCT40105T	SOT109A	16	SO16	28;91	IC06
PC74HCT4015P	SOT38Z	16	DIL	28	IC06
PC74HCT4015T	SOT109A	16	SO16	28	IC06
PC74HCT4016P	SOT27	14	DIL	28	IC06
PC74HCT4016T	SOT108A	14	SO14	28	IC06
PC74HCT4017P	SOT38Z	16	DIL	24	IC06
PC74HCT4017T	SOT109A	16	SO16	24	IC06
PC74HCT4020P	SOT38Z	16	DIL	24	IC06
PC74HCT4020T	SOT109A	16	SO16	24	IC06
PC74HCT4024P	SOT27	14	DIL	24	IC06
PC74HCT4024T	SOT108A	14	SO14	24	IC06
PC74HCT4040P	SOT38Z	16	DIL	24	IC06
PC74HCT4040T	SOT109A	16	SO16	24	IC06

extended type no.	package code	no. of pins	pin position	catalogue page no.	handbook
PC74HCT4046AP	SOT38Z	16	DIL	28;91	IC06
PC74HCT4046AT	SOT109A	16	SO16	28;91	IC06
PC74HCT4051P	SOT38Z	16	DIL	24;27	IC06
PC74HCT4051T	SOT109A	16	SO16	24;27	IC06
PC74HCT4052P	SOT38Z	16	DIL	24;27	IC06
PC74HCT4052T	SOT109A	16	SO16	24;27	IC06
PC74HCT4053P	SOT38Z	16	DIL	24;27	IC06
PC74HCT4053T	SOT109A	16	SO16	24;27	IC06
PC74HCT4059P	SOT101A	24	DIL	24	IC06
PC74HCT4059T	SOT137A	24	SO24	24	IC06
PC74HCT4060P	SOT38Z	16	DIL	24	IC06
PC74HCT4060T	SOT109A	16	SO16	24	IC06
PC74HCT4066P	SOT27	14	DIL	28	IC06
PC74HCT4066T	SOT108A	14	SO14	28	IC06
PC74HCT4067P	SOT101A	24	DIL	24;27	IC06
PC74HCT4067T	SOT137A	24	SO24	24;27	IC06
PC74HCT4075P	SOT27	14	DIL	26	IC06
PC74HCT4075T	SOT108A	14	SO14	26	IC06
PC74HCT4094P	SOT38Z	16	DIL	28	IC06
PC74HCT4094T	SOT109A	16	SO16	28	IC06
PC74HCT42P	SOT38Z	16	DIL	24	IC06
PC74HCT42T	SOT109A	16	SO16	24	IC06
PC74HCT423P	SOT38Z	16	DIL	27	IC06
PC74HCT423T	SOT109A	16	SO16	27	IC06
PC74HCT4316P	SOT38Z	16	DIL	28	IC06
PC74HCT4316T	SOT109A	16	SO16	28	IC06
PC74HCT4351P	SOT102	18	DIL	25;27	IC06
PC74HCT4351T	SOT163A	20	SO20	25;27	IC06
PC74HCT4352P	SOT102	18	DIL	25;27	IC06
PC74HCT4352T	SOT163A	20	SO20	25;27	IC06
PC74HCT4353P	SOT102	18	DIL	25;27	IC06
PC74HCT4353T	SOT163A	20	SO20	25;27	IC06
PC74HCT4510P	SOT38Z	16	DIL	24	IC06
PC74HCT4510T	SOT109A	16	SO16	24	IC06
PC74HCT4511P	SOT38Z	16	DIL	24;25	IC06
PC74HCT4511T	SOT109A	16	SO16	24;25	IC06
PC74HCT4514P	SOT101A	24	DIL	24;25	IC06
PC74HCT4514T	SOT137A	24	SO24	24;25	IC06
PC74HCT4515P	SOT101A	24	DIL	24;25	IC06
PC74HCT4515T	SOT137A	24	SO24	24;25	IC06
PC74HCT4516P	SOT38Z	16	DIL	24	IC06
PC74HCT4516T	SOT109A	16	SO16	24	IC06
PC74HCT4518P	SOT38Z	16	DIL	24	IC06
PC74HCT4518T	SOT109A	16	SO16	24	IC06
PC74HCT4520P	SOT38Z	16	DIL	24	IC06
PC74HCT4520T	SOT109A	16	SO16	24	IC06
PC74HCT4538P	SOT27	14	DIL	27	IC06
PC74HCT4538T	SOT108A	14	SO14	27	IC06
PC74HCT4543P	SOT38Z	16	DIL	24;25	IC06
PC74HCT4543T	SOT109A	16	SO16	24;25	IC06
PC74HCT533P	SOT146	20	DIL	25	IC06
PC74HCT533T	SOT163A	20	SO20	25	IC06
PC74HCT534P	SOT146	20	DIL	25	IC06
PC74HCT534T	SOT163A	20	SO20	25	IC06
PC74HCT540P	SOT146	20	DIL	23	IC06
PC74HCT540T	SOT163A	20	SO20	23	IC06
PC74HCT541P	SOT146	20	DIL	23	IC06

extended type no.	package code	no. of pins	pin position	catalogue page no.	handbook
PC74HCT541T	SOT163A	20	SO20	23	IC06
PC74HCT5555P	SOT38Z	16	DIL	27	IC06
PC74HCT5555T	SOT109A	16	SO16	27	IC06
PC74HCT563P	SOT146	20	DIL	25	IC06
PC74HCT563T	SOT163A	20	SO20	25	IC06
PC74HCT564P	SOT146	20	DIL	25	IC06
PC74HCT564T	SOT163A	20	SO20	25	IC06
PC74HCT573P	SOT146	20	DIL	25	IC06
PC74HCT573T	SOT163A	20	SO20	25	IC06
PC74HCT574P	SOT146	20	DIL	25	IC06
PC74HCT574T	SOT163A	20	SO20	25	IC06
PC74HCT583P	SOT38Z	16	DIL	23	IC06
PC74HCT583T	SOT109A	16	SO16	23	IC06
PC74HCT597P	SOT38Z	16	DIL	28	IC06
PC74HCT597T	SOT109A	16	SO16	28	IC06
PC74HCT640P	SOT146	20	DIL	23;28	IC06
PC74HCT640T	SOT163A	20	SO20	23;28	IC06
PC74HCT643P	SOT146	20	DIL	23;28	IC06
PC74HCT643T	SOT163A	20	SO20	23;28	IC06
PC74HCT646P	SOT101A	24	DIL	23;28	IC06
PC74HCT646T	SOT137A	24	SO24	23;28	IC06
PC74HCT648P	SOT101A	24	DIL	23;28	IC06
PC74HCT648T	SOT137A	24	SO24	23;28	IC06
PC74HCT670P	SOT38Z	16	DIL	28	IC06
PC74HCT670T	SOT109A	16	SO16	28	IC06
PC74HCT688P	SOT146	20	DIL	23	IC06
PC74HCT688T	SOT163A	20	SO20	23	IC06
PC74HCT7030P	SOT117	28	DIL	28;91	IC06
PC74HCT7030T	SOT136A	28	SO28	28;91	IC06
PC74HCT7046AP	SOT38Z	16	DIL	28	IC06
PC74HCT7046AT	SOT109A	16	SO16	28	IC06
PC74HCT7080P	SOT146	20	DIL	23	IC06
PC74HCT7080T	SOT163A	20	SO20	23	IC06
PC74HCT73P	SOT27	14	DIL	26	IC06
PC74HCT73T	SOT108A	14	SO14	26	IC06
PC74HCT74P	SOT27	14	DIL	25	IC06
PC74HCT74T	SOT108A	14	SO14	25	IC06
PC74HCT75P	SOT38Z	16	DIL	27	IC06
PC74HCT75T	SOT109A	16	SO16	27	IC06
PC74HCT7540P	SOT146	20	DIL	23;28	IC06
PC74HCT7540T	SOT163A	20	SO20	23;28	IC06
PC74HCT7541P	SOT146	20	DIL	23;28	IC06
PC74HCT7541T	SOT163A	20	SO20	23;28	IC06
PC74HCT7597P	SOT38Z	16	DIL	28	IC06
PC74HCT7597T	SOT109A	16	SO16	28	IC06
PC74HCT85P	SOT38Z	16	DIL	23	IC06
PC74HCT85T	SOT109A	16	SO16	23	IC06
PC74HCT86P	SOT27	14	DIL	26	IC06
PC74HCT86T	SOT108A	14	SO14	26	IC06
PC74HCT9014P	SOT146	20	DIL	23;28	IC06
PC74HCT9014T	SOT163A	20	SO20	23;28	IC06
PC74HCT9015P	SOT146	20	DIL	23;28	IC06
PC74HCT9015T	SOT163A	20	SO20	23;28	IC06
PC74HCT9114P	SOT146	20	DIL	23;28	IC06
PC74HCT9114T	SOT163A	20	SO20	23;28	IC06
PC74HCT9115P	SOT146	20	DIL	23;28	IC06
PC74HCT9115T	SOT163A	20	SO20	23;28	IC06

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PC74HCT93P	SOT27	14	DIL	24	IC06
PC74HCT93T	SOT108A	14	DIL	24	IC06
PC74HCU04P	SOT27	14	DIL	26	IC06
PC74HCU04T	SOT108A	14	SO14	26	IC06
PC74HC00P	SOT27	14	DIL	26	IC06
PC74HC00T	SOT108A	14	SO14	26	IC06
PC74HC02P	SOT27	14	DIL	26	IC06
PC74HC02T	SOT108A	14	SO14	26	IC06
PC74HC03P	SOT27	14	DIL	26	IC06
PC74HC03T	SOT108A	14	SO14	26	IC06
PC74HC04P	SOT27	14	DIL	26	IC06
PC74HC04T	SOT108A	14	SO14	26	IC06
PC74HC08P	SOT27	14	DIL	26	IC06
PC74HC08T	SOT108A	14	SO14	26	IC06
PC74HC10P	SOT27	14	DIL	26	IC06
PC74HC10T	SOT108A	14	SO14	26	IC06
PC74HC107P	SOT27	14	DIL	26	IC06
PC74HC107T	SOT108A	14	SO14	26	IC06
PC74HC109P	SOT38Z	16	DIL	26	IC06
PC74HC109T	SOT109A	16	SO16	26	IC06
PC74HC11P	SOT27	14	DIL	26	IC06
PC74HC11T	SOT108A	14	SO14	26	IC06
PC74HC112P	SOT38Z	16	DIL	26	IC06
PC74HC112T	SOT109A	16	SO16	26	IC06
PC74HC123P	SOT38Z	16	DIL	27	IC06
PC74HC123T	SOT109A	16	SO16	27	IC06
PC74HC125P	SOT27	14	DIL	23	IC06
PC74HC125T	SOT108A	14	SO14	23	IC06
PC74HC126P	SOT27	14	DIL	23	IC06
PC74HC126T	SOT108A	14	SO14	23	IC06
PC74HC132P	SOT27	14	DIL	28	IC06
PC74HC132T	SOT108A	14	SO14	28	IC06
PC74HC137P	SOT38Z	16	DIL	24	IC06
PC74HC137T	SOT109A	16	SO16	24	IC06
PC74HC138P	SOT38Z	16	DIL	24	IC06
PC74HC138T	SOT109A	16	SO16	24	IC06
PC74HC139P	SOT38Z	16	DIL	24	IC06
PC74HC139T	SOT109A	16	SO16	24	IC06
PC74HC14P	SOT27	14	DIL	28	IC06
PC74HC14T	SOT108A	14	SO14	28	IC06
PC74HC147P	SOT38Z	16	DIL	25	IC06
PC74HC147T	SOT109A	16	SO16	25	IC06
PC74HC151P	SOT38Z	16	DIL	27	IC06
PC74HC151T	SOT109A	16	SO16	27	IC06
PC74HC153P	SOT38Z	16	DIL	27	IC06
PC74HC153T	SOT109A	16	SO16	27	IC06
PC74HC154P	SOT101A	24	DIL	24	IC06
PC74HC154T	SOT137A	24	SO24	24	IC06
PC74HC157P	SOT38Z	16	DIL	27	IC06
PC74HC157T	SOT109A	16	SO16	27	IC06
PC74HC158P	SOT38Z	16	DIL	27	IC06
PC74HC158T	SOT109A	16	SO16	27	IC06
PC74HC160P	SOT38Z	16	DIL	24	IC06
PC74HC160T	SOT109A	16	SO16	24	IC06
PC74HC161P	SOT38Z	16	DIL	24	IC06
PC74HC161T	SOT109A	16	SO16	24	IC06
PC74HC162P	SOT38Z	16	DIL	24	IC06

extended type no.	package code	no. of pins	pin position	catalogue page no.	handbook
PC74HC162T	SOT109A	16	SO16	24	IC06
PC74HC163P	SOT38Z	16	DIL	24	IC06
PC74HC163T	SOT109A	16	SO16	24	IC06
PC74HC164P	SOT27	14	DIL	27	IC06
PC74HC164T	SOT108A	14	SO14	27	IC06
PC74HC165P	SOT38Z	16	DIL	27	IC06
PC74HC165T	SOT109A	16	SO16	27	IC06
PC74HC166P	SOT38Z	16	DIL	27	IC06
PC74HC166T	SOT109A	16	SO16	27	IC06
PC74HC173P	SOT38Z	16	DIL	25	IC06
PC74HC173T	SOT109A	16	SO16	25	IC06
PC74HC174P	SOT38Z	16	DIL	25	IC06
PC74HC174T	SOT109A	16	SO16	25	IC06
PC74HC175P	SOT38Z	16	DIL	25	IC06
PC74HC175T	SOT109A	16	SO16	25	IC06
PC74HC181P	SOT101A	24	DIL	23	IC06
PC74HC181T	SOT137A	24	SO24	23	IC06
PC74HC182P	SOT38Z	16	DIL	23	IC06
PC74HC182T	SOT109A	16	SO16	23	IC06
PC74HC190P	SOT38Z	16	DIL	24	IC06
PC74HC190T	SOT109A	16	SO16	24	IC06
PC74HC191P	SOT38Z	16	DIL	24	IC06
PC74HC191T	SOT109A	16	SO16	24	IC06
PC74HC192P	SOT38Z	16	DIL	24	IC06
PC74HC192T	SOT109A	16	SO16	24	IC06
PC74HC193P	SOT38Z	16	DIL	24	IC06
PC74HC193T	SOT109A	16	SO16	24	IC06
PC74HC194P	SOT38Z	16	DIL	28	IC06
PC74HC194T	SOT109A	16	SO16	28	IC06
PC74HC195P	SOT38Z	16	DIL	28	IC06
PC74HC195T	SOT109A	16	SO16	28	IC06
PC74HC20P	SOT27	14	DIL	26	IC06
PC74HC20T	SOT108A	14	SO14	26	IC06
PC74HC21P	SOT27	14	DIL	26	IC06
PC74HC21T	SOT108A	14	SO14	26	IC06
PC74HC221P	SOT38Z	16	DIL	27	IC06
PC74HC221T	SOT109A	16	SO16	27	IC06
PC74HC237P	SOT38Z	16	DIL	24	IC06
PC74HC237T	SOT109A	16	SO16	24	IC06
PC74HC238P	SOT38Z	16	DIL	24	IC06
PC74HC238T	SOT109A	16	SO16	24	IC06
PC74HC240P	SOT146	20	DIL	23	IC06
PC74HC240T	SOT163A	20	SO20	23	IC06
PC74HC241P	SOT146	20	DIL	23	IC06
PC74HC241T	SOT163A	20	SO20	23	IC06
PC74HC242P	SOT27	14	DIL	23;28	IC06
PC74HC242T	SOT108A	14	SO14	23;28	IC06
PC74HC243P	SOT27	14	DIL	23;28	IC06
PC74HC243T	SOT108A	14	SO14	23;28	IC06
PC74HC244P	SOT146	20	DIL	23	IC06
PC74HC244T	SOT163A	20	SO20	23	IC06
PC74HC245P	SOT146	20	DIL	23;28	IC06
PC74HC245T	SOT163A	20	SO20	23;28	IC06
PC74HC251P	SOT38Z	16	DIL	27	IC06
PC74HC251T	SOT109A	16	SO16	27	IC06
PC74HC253P	SOT38Z	16	DIL	27	IC06
PC74HC253T	SOT109A	16	SO16	27	IC06

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PC74HC257P	SOT38Z	16	DIL	27	IC06
PC74HC257T	SOT109A	16	SO16	27	IC06
PC74HC258P	SOT38Z	16	DIL	27	IC06
PC74HC258T	SOT109A	16	SO16	27	IC06
PC74HC259P	SOT38Z	16	DIL	27	IC06
PC74HC259T	SOT109A	16	SO16	27	IC06
PC74HC27P	SOT27	14	DIL	26	IC06
PC74HC27T	SOT108A	14	SO14	26	IC06
PC74HC273P	SOT146	20	DIL	25	IC06
PC74HC273T	SOT163A	20	SO20	25	IC06
PC74HC280P	SOT27	14	DIL	23	IC06
PC74HC280T	SOT108A	14	SO14	23	IC06
PC74HC283P	SOT38Z	16	DIL	23	IC06
PC74HC283T	SOT109A	16	SO16	23	IC06
PC74HC297P	SOT38Z	16	DIL	28	IC06
PC74HC297T	SOT109A	16	SO16	28	IC06
PC74HC299P	SOT146	20	DIL	28	IC06
PC74HC299T	SOT163A	20	SO20	28	IC06
PC74HC30P	SOT27	14	DIL	26	IC06
PC74HC30T	SOT108A	14	SO14	26	IC06
PC74HC32P	SOT27	14	DIL	26	IC06
PC74HC32T	SOT108A	14	SO14	26	IC06
PC74HC354P	SOT146	20	DIL	27;28	IC06
PC74HC354T	SOT163A	20	SO20	27;28	IC06
PC74HC356P	SOT146	20	DIL	27;28	IC06
PC74HC356T	SOT163A	20	SO20	27;28	IC06
PC74HC365P	SOT38Z	16	DIL	23	IC06
PC74HC365T	SOT109A	16	SO16	23	IC06
PC74HC366P	SOT38Z	16	DIL	23	IC06
PC74HC366T	SOT109A	16	SO16	23	IC06
PC74HC367P	SOT38Z	16	DIL	23	IC06
PC74HC367T	SOT109A	16	SO16	23	IC06
PC74HC368P	SOT38Z	16	DIL	23	IC06
PC74HC368T	SOT109A	16	SO16	23	IC06
PC74HC373P	SOT146	20	DIL	25	IC06
PC74HC373T	SOT163A	20	SO20	25	IC06
PC74HC374P	SOT146	20	DIL	25	IC06
PC74HC374T	SOT163A	20	SO20	25	IC06
PC74HC377P	SOT146	20	DIL	25	IC06
PC74HC377T	SOT163A	20	SO20	25	IC06
PC74HC390P	SOT38Z	16	DIL	24	IC06
PC74HC390T	SOT109A	16	SO16	24	IC06
PC74HC393P	SOT38Z	16	DIL	24	IC06
PC74HC393T	SOT109A	16	SO16	24	IC06
PC74HC4002P	SOT27	14	DIL	26	IC06
PC74HC4002T	SOT108A	14	SO14	26	IC06
PC74HC40102P	SOT38Z	16	DIL	24	IC06
PC74HC40102T	SOT109A	16	SO16	24	IC06
PC74HC40103P	SOT38Z	16	DIL	24	IC06
PC74HC40103T	SOT109A	16	SO16	24	IC06
PC74HC40104P	SOT38Z	16	DIL	28	IC06
PC74HC40104T	SOT109A	16	SO16	28	IC06
PC74HC40105P	SOT38Z	16	DIL	28;91	IC06
PC74HC40105T	SOT109A	16	SO16	28;91	IC06
PC74HC4015P	SOT38Z	16	DIL	28	IC06
PC74HC4015T	SOT109A	16	SO16	28	IC06
PC74HC4016P	SOT27	14	DIL	28	IC06

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PC74HC4016T	SOT108A	14	SO14	28	IC06
PC74HC4017P	SOT38Z	16	DIL	24	IC06
PC74HC4017T	SOT109A	16	SO16	24	IC06
PC74HC4020P	SOT38Z	16	DIL	24	IC06
PC74HC4020T	SOT109A	16	SO16	24	IC06
PC74HC4024P	SOT27	14	DIL	24	IC06
PC74HC4024T	SOT108A	14	SO14	24	IC06
PC74HC4040P	SOT38Z	16	DIL	24	IC06
PC74HC4040T	SOT109A	16	SO16	24	IC06
PC74HC4046AP	SOT38Z	16	DIL	28;91;111	IC06
PC74HC4046AT	SOT109A	16	SO16	28;91;111	IC06
PC74HC4049P	SOT38Z	16	DIL	27	IC06
PC74HC4049T	SOT109A	16	SO16	27	IC06
PC74HC4050P	SOT38Z	16	DIL	27	IC06
PC74HC4050T	SOT109A	16	SO16	27	IC06
PC74HC4051P	SOT38Z	16	DIL	24;27	IC06
PC74HC4051T	SOT109A	16	SO16	24;27	IC06
PC74HC4052P	SOT38Z	16	DIL	24;27	IC06
PC74HC4052T	SOT109A	16	SO16	24;27	IC06
PC74HC4053P	SOT38Z	16	DIL	24;27	IC06
PC74HC4053T	SOT109A	16	SO16	24;27	IC06
PC74HC4059P	SOT101A	24	DIL	24	IC06
PC74HC4059T	SOT137A	24	SO24	24	IC06
PC74HC4060P	SOT38Z	16	DIL	24	IC06
PC74HC4060T	SOT109A	16	SO16	24	IC06
PC74HC4066P	SOT27	14	DIL	28	IC06
PC74HC4066T	SOT108A	14	SO14	28	IC06
PC74HC4067P	SOT101A	24	DIL	24;27	IC06
PC74HC4067T	SOT137A	24	SO24	24;27	IC06
PC74HC4075P	SOT27	14	DIL	26	IC06
PC74HC4075T	SOT108A	14	SO14	26	IC06
PC74HC4094P	SOT38Z	16	DIL	28	IC06
PC74HC4094T	SOT109A	16	SO16	28	IC06
PC74HC42P	SOT38Z	16	DIL	24	IC06
PC74HC42T	SOT109A	16	SO16	24	IC06
PC74HC423P	SOT38Z	16	DIL	27	IC06
PC74HC423T	SOT109A	16	SO16	27	IC06
PC74HC4316P	SOT38Z	16	DIL	28	IC06
PC74HC4316T	SOT109A	16	SO16	28	IC06
PC74HC4351P	SOT102	18	DIL	25;27	IC06
PC74HC4351T	SOT163A	20	SO20	25;27	IC06
PC74HC4352P	SOT102	18	DIL	25;27	IC06
PC74HC4352T	SOT163A	20	SO20	25;27	IC06
PC74HC4353P	SOT102	18	DIL	25;27	IC06
PC74HC4353T	SOT163A	20	SO20	25;27	IC06
PC74HC4510P	SOT38Z	16	DIL	24	IC06
PC74HC4510T	SOT109A	16	SO16	24	IC06
PC74HC4511P	SOT38Z	16	DIL	24;25	IC06
PC74HC4511T	SOT109A	16	SO16	24;25	IC06
PC74HC4514P	SOT101A	24	DIL	24;25	IC06
PC74HC4514T	SOT137A	24	SO24	24;25	IC06
PC74HC4515P	SOT101A	24	DIL	24;25	IC06
PC74HC4515T	SOT137A	24	SO24	24;25	IC06
PC74HC4516P	SOT38Z	16	DIL	24	IC06
PC74HC4516T	SOT109A	16	SO16	24	IC06
PC74HC4518P	SOT38Z	16	DIL	24	IC06
PC74HC4518T	SOT109A	16	SO16	24	IC06

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PC74HC4520P	SOT38Z	16	DIL	24	IC06
PC74HC4520T	SOT109A	16	SO16	24	IC06
PC74HC4538P	SOT27	14	DIL	27	IC06
PC74HC4538T	SOT108A	14	SO14	27	IC06
PC74HC4543P	SOT38Z	16	DIL	24;25	IC06
PC74HC4543T	SOT109A	16	SO16	24;25	IC06
PC74HC533P	SOT146	20	DIL	25	IC06
PC74HC533T	SOT163A	20	SO20	25	IC06
PC74HC534P	SOT146	20	DIL	25	IC06
PC74HC534T	SOT163A	20	SO20	25	IC06
PC74HC540P	SOT146	20	DIL	23	IC06
PC74HC540T	SOT163A	20	SO20	23	IC06
PC74HC541P	SOT146	20	DIL	23	IC06
PC74HC541T	SOT163A	20	SO20	23	IC06
PC74HC5555P	SOT38Z	16	DIL	27	IC06
PC74HC5555T	SOT109A	16	SO16	27	IC06
PC74HC563P	SOT146	20	DIL	25	IC06
PC74HC563T	SOT163A	20	SO20	25	IC06
PC74HC564P	SOT146	20	DIL	25	IC06
PC74HC564T	SOT163A	20	SO20	25	IC06
PC74HC573P	SOT146	20	DIL	25	IC06
PC74HC573T	SOT163A	20	SO20	25	IC06
PC74HC574P	SOT146	20	DIL	25	IC06
PC74HC574T	SOT163A	20	SO20	25	IC06
PC74HC58P	SOT27	14	DIL	26	IC06
PC74HC58T	SOT108A	14	SO14	26	IC06
PC74HC583P	SOT38Z	16	DIL	23	IC06
PC74HC583T	SOT109A	16	SO16	23	IC06
PC74HC597P	SOT38Z	16	DIL	28	IC06
PC74HC597T	SOT109A	16	SO16	28	IC06
PC74HC640P	SOT146	20	DIL	23;28	IC06
PC74HC640T	SOT163A	20	SO20	23;28	IC06
PC74HC643P	SOT146	20	DIL	23;28	IC06
PC74HC643T	SOT163A	20	SO20	23;28	IC06
PC74HC646P	SOT101A	24	DIL	23;28	IC06
PC74HC646T	SOT137A	24	SO24	23;28	IC06
PC74HC648P	SOT101A	24	DIL	23;28	IC06
PC74HC648T	SOT137A	24	SO24	23;28	IC06
PC74HC670P	SOT38Z	16	DIL	28	IC06
PC74HC670T	SOT109A	16	SO16	28	IC06
PC74HC688P	SOT146	20	DIL	23	IC06
PC74HC688T	SOT163A	20	SO20	23	IC06
PC74HC7030P	SOT117	28	DIL	28;91	IC06
PC74HC7030T	SOT136A	28	SO28	28;91	IC06
PC74HC7046AP	SOT38Z	16	DIL	28	IC06
PC74HC7046AT	SOT109A	16	SO16	28	IC06
PC74HC7080P	SOT146	20	DIL	23	IC06
PC74HC7080T	SOT163A	20	SO20	23	IC06
PC74HC7266P	SOT27	14	DIL	26	IC06
PC74HC7266T	SOT108A	14	SO14	26	IC06
PC74HC73P	SOT27	14	DIL	26	IC06
PC74HC73T	SOT108A	14	SO14	26	IC06
PC74HC74P	SOT27	14	DIL	25	IC06
PC74HC74T	SOT108A	14	SO14	25	IC06
PC74HC75P	SOT38Z	16	DIL	27	IC06
PC74HC75T	SOT109A	16	SO16	27	IC06
PC74HC7540P	SOT146	20	DIL	23;28	IC06

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PC74HC7540T	SOT163A	20	SO20	23;28	IC06
PC74HC7541P	SOT146	20	DIL	23;28	IC06
PC74HC7541T	SOT163A	20	SO20	23;28	IC06
PC74HC7597P	SOT38Z	16	DIL	28	IC06
PC74HC7597T	SOT109A	16	SO16	28	IC06
PC74HC85P	SOT38Z	16	DIL	23	IC06
PC74HC85T	SOT109A	16	SO16	23	IC06
PC74HC86P	SOT27	14	DIL	26	IC06
PC74HC86T	SOT108A	14	SO14	26	IC06
PC74HC9014P	SOT146	20	DIL	23;28	IC06
PC74HC9014T	SOT163A	20	SO20	23;28	IC06
PC74HC9015P	SOT146	20	DIL	23;28	IC06
PC74HC9015T	SOT163A	20	SO20	23;28	IC06
PC74HC9114P	SOT146	20	DIL	23;28	IC06
PC74HC9114T	SOT163A	20	SO20	23;28	IC06
PC74HC9115P	SOT146	20	DIL	23;28	IC06
PC74HC9115T	SOT163A	20	SO20	23;28	IC06
PC74HC93P	SOT27	14	DIL	24	IC06
PC74HC93T	SOT108A	14	DIL	24	IC06
PGT200–003	–	–	–	132	–
PGT200–006	–	–	–	132	–
PGT200–010	–	–	–	132	–
PGT200–017	–	–	–	132	–
PGT200–024	–	–	–	132	–
PGT200–029	–	–	–	132	–
PGT200–033	–	–	–	132	–
PGT200–042	–	–	–	132	–
PGT200–056	–	–	–	132	–
PGT200–073	–	–	–	132	–
PGT200–109	–	–	–	132	–
PGT200–145	–	–	–	132	–
PGT200–180	–	–	–	132	–
PLC153–45A	A	20	PLCC	128	DS
PLC153–45FA	FA	20	CERDIP	128	DS
PLC153–45N	N	20	PLDIL	128	DS
PLC153–60A	A	20	PLCC	128	DS
PLC153–60FA	FA	20	CERDIP	128	DS
PLC153–60N	N	20	PLDIL	128	DS
PLC16V8H35A	A	20	PLCC	128	DS
PLC16V8H35FA	FA	20	CERDIP	128	DS
PLC16V8H35N	N	20	PLDIL	128	DS
PLC16V8H45A	A	20	PLCC	128	DS
PLC16V8H45FA	FA	20	CERDIP	128	DS
PLC16V8H45N	N	20	PLDIL	128	DS
PLC16V8Q35A	A	20	PLCC	128	DS
PLC16V8Q35FA	FA	20	CERDIP	128	DS
PLC16V8Q35N	N	20	PLDIL	128	DS
PLC16V8Q45A	A	20	PLCC	128	DS
PLC16V8Q45FA	FA	20	CERDIP	128	DS
PLC16V8Q45N	N	20	PLDIL	128	DS
PLC20V8H35A	A	24	PLCC	128	DS
PLC20V8H35FA	FA	24	CERDIP	128	DS
PLC20V8H35N	N	24	PLDIL	128	DS
PLC20V8H45A	A	24	PLCC	128	DS
PLC20V8H45FA	FA	24	CERDIP	128	DS
PLC20V8H45N	N	24	PLDIL	128	DS
PLC20V8Q35A	A	24	PLCC	128	DS

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PLC20V8Q35FA	FA	24	CERDIP	128	DS
PLC20V8Q35N	N	24	PLDIL	128	DS
PLC20V8Q45A	A	24	PLCC	128	DS
PLC20V8Q45FA	FA	24	CERDIP	128	DS
PLC20V8Q45N	N	24	PLDIL	128	DS
PLC473–60FA	FA	24	CERDIP	128	IC13
PLHS153A	A	20	PLCC	128	IC13
PLHS153N	N	20	PLDIL	128	IC13
PLHS16L8AA	A	20	PLCC	128	DS
PLHS16L8AN	N	20	PLDIL	128	DS
PLHS16L8BA	A	20	PLCC	128	DS
PLHS16L8BN	N	20	PLDIL	128	DS
PLHS18P8AA	A	20	PLCC	128	DS IC13
PLHS18P8AN	N	20	PLDIL	128	DS IC13
PLHS18P8BA	A	20	PLCC	128	DS
PLHS18P8BN	N	20	PLDIL	128	DS
PLHS473A	A	28	PLCC	128	IC13
PLHS473N	N	24	PLDIL	128	IC13
PLHS501	A	52	PLCC	129	DS IC13
PLHS502	A	52	PLCC	129	IC13
PLS100A	AQ	28	PLCC	128	IC13
PLS100F	FQ	28	CERDIP	128	IC13
PLS100N	NQ	28	PLDIL	128	IC13
PLS101A	AQ	28	PLCC	128	IC13
PLS101F	FQ	28	CERDIP	128	IC13
PLS101N	NQ	28	PLDIL	128	IC13
PLS105A	AQ	28	PLCC	128	IC13
PLS105AA	AQ	28	PLCC	128	IC13
PLS105AF	FQ	28	CERDIP	128	IC13
PLS105AN	NQ	28	PLDIL	128	IC13
PLS105F	FQ	28	CERDIP	128	IC13
PLS105N	NQ	28	PLDIL	128	IC13
PLS153AA	AL	20	PLCC	128	IC13
PLS153AF	FL	20	CERDIP	128	IC13
PLS153AN	NL	20	PLDIL	128	IC13
PLS153F	FL	20	CERDIP	128	IC13
PLS153N	NL	20	PLDIL	128	IC13
PLS155A	AL	20	PLCC	128	IC13
PLS155AF	AL	20	PLCC	128	IC13
PLS155F	FL	20	CERDIP	128	IC13
PLS155N	NL	20	PLDIL	128	IC13
PLS157A	AL	20	PLCC	128	IC13
PLS157F	FL	20	CERDIP	128	IC13
PLS157N	NL	20	PLDIL	128	IC13
PLS159AA	AL	20	PLCC	128	IC13
PLS159AF	FL	20	CERDIP	128	IC13
PLS159AN	NL	20	PLDIL	128	IC13
PLS163AN	NN	24	PLDIL	128	IC13
PLS167A	AQ	28	PLCC	128	IC13
PLS167AA	AQ	28	PLCC	128	IC13
PLS167AF	FN	24	CERDIP	128	IC13
PLS167AN	NN	24	PLDIL	128	IC13
PLS167F	FN	24	CERDIP	128	IC13
PLS167N	NN	24	PLDIL	128	IC13

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PLS168A	AQ	28	PLCC	128	IC13
PLS168AA	AQ	28	PLCC	128	IC13
PLS168AF	FN	24	CERDIP	128	IC13
PLS168AN	NN	24	PLDIL	128	IC13
PLS168F	FN	24	CERDIP	128	IC13
PLS168N	NN	24	PLDIL	128	IC13
PLS173A	AQ	28	PLCC	128	IC13
PLS173N	NN	24	PLDIL	128	IC13
PLS179A	AQ	28	PLCC	128	IC13
PLS179F	FN	24	CERDIP	128	IC13
PLS179N	NN	24	PLDIL	128	IC13
PLUS153	A	20	PLCC	128	IC13
PLUS173	A	28	PLCC	128	IC13
PLUS405A	A	28	PLCC	128	DS IC13
PLUS405N	N	28	PLDIL	128	DS IC13
PNA7509P	SOT101A	24	DIL	95;114	IC01 IC02
PNA7509T	SOT137A	24	SO24	95;114	–
PNA7518	SOT38D	16	DIL	95;114	IC01 IC02
SAA1027	SOT38A	16	DIL	84	IC11
SAA1029	SOT38	16	DIL	83	IC11
SAA1043	SOT117	28	DIL	113	IC02
SAA1044	SOT38	16	DIL	113	IC02
SAA1045P	SOT97	8	DIL	74;91	DS
SAA1045T	SOT96A	8	SO8	74;91	DS
SAA1057	SOT102H	18	DIL	97;105;127	IC01 IC02
SAA1060	SOT101A	24	DIL	97;115	IC01 IC02
SAA1064P	SOT101B	24	DIL	81;90;97;99; 115;118	IC01 IC02 IC12
SAA1064T	SOT137A	24	SO24	81;90;97;99; 115;118	IC12
SAA1099	SOT102M	18	DIL	73;104;127	IC01 IC02
SAA1101P	SOT117	28	DIL	113	–
SAA1235P	SOT101	24	DIL	91	–
SAA1235T	SOT137A	24	SO24	91	–
SAA1300	SOT142	9	SIL	99;105;118;127	IC01 IC02 IC12
SAA3004P	SOT146	20	DIL	104;124	IC01 IC02
SAA3004T	SOT163A	20	SO20	104;124	IC01 IC02
SAA3006P	SOT117	28	DIL	104;124	IC01 IC02
SAA3007P	SOT146	20	DIL	104	DS
SAA3007T	SOT163A	20	SO20	104	DS
SAA3008	–	20	DIL	104;124	–
SAA3009P	SOT146	20	DIL	104	DS
SAA3009T	SOT163A	20	SO20	104	DS
SAA3010P	SOT117	28	DIL	104	–

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SAA3010T	SOT136A	28	SO28	104	–
SAA3027P	SOT117	28	DIL	104;124	–
SAA3028	SOT38Z	16	DIL	99;104;118;124	IC01 IC02 IC12
SAA3049P	SOT146	20	DIL	104	DS
SAA3049T	SOT163A	20	SO20	104	DS
SAA4700P	SOT146	20	DIL	123	DS
SAA5030	SOT101A	24	DIL	126	–
SAA5045	SOT117	28	DIL	126	–
SAA5230	SOT117	28	DIL	126	–
SAA5231	SOT117	28	DIL	126	IC02
SAA5235	SOT117	28	DIL	123;126	IC02
SAA5236	SOT146	20	DIL	123	DS
SAA5243E	SOT129	40	DIL	118;126	DS
SAA5243H	SOT129	40	DIL	118;126	DS
SAA5243K	SOT129	40	DIL	118;126	DS
SAA5243L	SOT129	40	DIL	118;126	DS
SAA5245A	SOT129	40	DIL	118;126	DS
SAA5246E	–	48	DIL	118;126	–
SAA5250P	SOT129	40	DIL	126	IC02
SAA5250T	SOT158A	40	VSO40	126	IC02
SAA5350	SOT129	40	DIL	73;126	IC02
SAA5351	SOT129	40	DIL	126	DS
SAA5355	SOT129	40	DIL	127	IC02
SAA5361	SOT129	40	DIL	127	DS
SAA7210	SOT129	40	DIL	96	IC01
SAA7220	SOT101A	24	DIL	96	IC01
SAA7272WP	SOT188	68	PLCC	124	–
SAA7273P	SOT102	18	DIL	124	–
SAA7274P	SOT101	24	DIL	96	–
SAA7274T	SOT137A	24	SO24	96	–
SAA7310GP	SOT205A	44	QFP	96	IC01
SAA7320GP	SOT205A	44	QFP	95;96	DS
SAA7340GP	SOT219	80	QFP	96	–
SAA7500WP	SOT188	68	PLCC	105	–
SAA7579T	SOT162A	16	SO16L	103	–
SAA7610P	SOT117	28	DIL	96	–
SAA7611P	SOT117	28	DIL	96	–
SAA7630P	SOT38D	16	DIL	96	–
SAA7630T	SOT162A	16	SO16L	96	–
SAA9041AP	SOT129	40	DIL	118;127	DS
SAA9050	SOT129	40	DIL	114;118	IC02 IC12
SAA9051	SOT188	68	PLCC	113;114;118	–
SAA9055	SOT117	28	DIL	113;114;118	DS
SAA9057	SOT146	20	DIL	114	IC02
SAA9058	SOT146	20	DIL	114	IC02
SAA9060	SOT117	28	DIL	114	DS
SAA9062	SOT129	40	DIL	114;118;126	–
SAA9063	SOT129	40	DIL	115;118;126	–
SAA9064	SOT129	40	DIL	115;118;126	–
SAA9068WP	SOT188	68	PLCC	115;118;127	IC12
SAA9069T	SOT163A	20	SO20	115;127	DS
SAA9079P	SOT101A	24	DIL	114;115	DS
SAA9079T	SOT137A	24	SO24	114;115	DS
SAB3035	SOT117	28	DIL	118;127	IC02

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SAB3035	SOT117	28	DIL	118;127	IC12
SAB3036	SOT102H	18	DIL	118;127	IC02 IC12
SAB3037	SOT101A	24	DIL	118;127	IC02 IC12
SAB6456	SOT97	8	DIL	105;127	IC01 IC02
SAB6456T	SOT96A	8	SO8	105;127	IC01 IC02
SAB8726	SOT97	8	DIL	127	DS
SAD1009P	SOT101A	24	DIL	114;123	IC02
SAD1009T	SOT137A	24	SO24	114;123	IC02
SAD1019P	SOT101B	24	DIL	113	DS
SAD1019T	SOT137A	24	SO24	113	DS
SAF1032P	SOT102H	18	DIL	104;124	IC01 IC02
SAF1039P	SOT38Z	16	DIL	104;124	IC01 IC02
SAF1135	SOT27	14	DIL	118;123	IC02 IC12
SA1458D	DE	8	SO8	77	IC11
SA1458N	NE	8	PLDIL	77	IC11
SA4558FE	FE	8	CERDIP	77	IC11
SA4558N	N	8	PLDIL	77	IC11
SA5105AD	D	8	SO8	79	IC11
SA5105AN	N	8	PLDIL	79	IC11
SA5105D	D	8	SO8	79	IC11
SA5105N	N	8	PLDIL	79	IC11
SA5204D	DE	8	SO8	77;91	IC11 IC19
SA5204N	NE	8	PLDIL	77;91	IC11 IC19
SA5205D	DE	8	SO8	77;91	IC11 IC19
SA5205FE	FE	8	CERDIP	77;91	IC11 IC19
SA5205N	NE	8	PLDIL	77;91	IC11 IC19
SA5212D	D	8	SO8	77;91	IC11 IC19
SA5212FE	FE	8	CERDIP	77;91	IC11 IC19
SA5212N	N	8	PLDIL	77;91	IC11 IC19
SA5230D	DE	8	SO8	77;106	IC11 IC03
SA5230FE	FE	8	CERDIP	77;106	–
SA5230N	NE	8	PLDIL	77;106	IC11 IC03
SA532D	DE	8	SO8	77	IC11
SA532FE	FE	8	CERDIP	77	IC11
SA532N	NE	8	PLDIL	77	IC11
SA534D	DH	14	SO14	77	IC11
SA534F	F	14	CERDIP	77	IC11
SA534N	NH	14	PLDIL	77	IC11
SA5512D	DE	8	SO8	77	–
SA5521D	DJ	16	SO16	85	IC11

extended type no.	package code	no. of pins	pin position	catalogue page no.	handbook
SA5521N	NK	18	PLDIL	85	IC11
SA5534AN	N	8	PLDIL	77	IC11
SA5534N	N	8	PLDIL	77	IC11
SA555D	DE	8	SO8	88	–
SA555N	NE	8	PLDIL	88	–
SA556–1F	F	14	CERDIP	88	IC11
SA556–1N	N	14	PLDIL	88	IC11
SA556N	N	14	PLDIL	88	IC11
SA5570D	DN	24	SO24	84	–
SA5570F	F	24	CERDIP	84	IC11
SA5570N	NN	24	PLDIL	84	IC11
SA558F	F	16	CERDIP	88	IC11
SA558N	N	16	PLDIL	88	IC11
SA571D	D	16	SO16L	93;110	–
SA571F	FJ	16	CERDIP	93;110	IC11 IC17
SA571N	NJ	16	PLDIL	93;110	IC11 IC17
SA572D	DJ	16	SO16L	93;110	IC11
SA572F	F	16	CERDIP	93;110	IC11
SA572N	NJ	16	PLDIL	93;110	IC11
SA575D	D	20	SO20	93;110	–
SA575N	N	20	PLDIL	93;110	–
SA594F	F	18	CERDIP	81;90	IC11
SA594N	NK	18	PLDIL	81;90	IC11
SA602D	DE	8	SO8	91;93;110	IC11 IC17 IC19
SA602FE	FE	8	CERDIP	91;93;110	IC11 IC17 IC19
SA602N	NE	8	PLDIL	91;93;110	IC11 IC17 IC19
SA604D	DJ	16	SO16	91;93;110	IC11 IC17 IC19
SA604F	FJ	16	CERDIP	91;93;110	IC11 IC17 IC19
SA604N	NJ	16	PLDIL	91;93;110	IC11 IC17 IC19
SA605D	D	20	SO20	93;103;110	IC11 IC17
SA605F	F	20	CERDIP	93;103;110	IC11 IC17
SA605N	N	20	PLDIL	93;103;110	IC11 IC17
SA723CN	N	14	PLDIL	86	IC11
SA741CN	N	8	PLDIL	77	IC11
SA747CN	N	14	PLDIL	77	IC11
SCB2675BC5N40	NW	40	PLDIL	74	IC18
SCB2675CC5N40	NW	40	PLDIL	74	IC18
SCB2675TC4N40	NW	40	PLDIL	74	IC18
SCB2677AC5A44	AX	44	PLCC	74	IC18
SCB2677AC5N40	NW	40	PLDIL	74	IC18

extended type no.	package code	no. of pins	pin position	catalogue page no.	handbook
SCB2677BC5N40	NW	40	PLDIL	74	IC18
SCB68154CAA44	AX	44	PLCC	74	IC18
SCB68154C2I40	IW	40	CERDIL	74	IC18
SCB68154C2N40	NW	40	PLDIL	74	IC18
SCB68155CAA44	AX	44	PLCC	74	IC18
SCB68155CAI40	IW	40	CERDIL	74	IC18
SCB68155CAN40	NW	40	PLDIL	74	IC18
SCB68171C3N16	NJ	16	PLDIL	74	DS
SCB68172C2A44	AX	44	PLCC	74	IC18
SCB68172C2F28	FQ	28	CERDIP	74	IC18
SCB68172C2N28	NQ	28	PLDIL	74	IC18
SCB68175C2F24	FN	24	CERDIP	74	–
SCB68175C2I24	IN	24	CERDIL	74	DS
SCB68175C2N24	NN	24	PLDIL	74	DS
SCB68430CAA52	AA	52	PLCC	74	IC18
SCB68430CAI48	IY	48	CERDIL	74	IC18
SCB68430CAN48	NY	48	PLDIL	74	IC18
SCB68430CCA52	AA	52	PLCC	74	IC18
SCB68430CCI48	IY	48	CERDIL	74	IC18
SCB68430CCN48	NY	48	PLDIL	74	IC18
SCC2691AA1A28	A	28	PLCC	74;91	IC19
SCC2691AA1N24	N	24	PLDIL	74;91	IC19
SCC2691AC1A28	AQ	28	PLCC	74;91	IC18 IC19
SCC2691AC1N24	NN	24	PLDIL	74;91	IC18 IC19
SCC2691C1A28	AQ	28	PLCC	74;91	IC18
SCC2691C1N24	NN	24	PLDIL	74;91	IC18
SCC2692AC1A44	A	44	PLCC	74;91	IC18 IC19
SCC2692AC1I28	I	28	CERDIL	74;91	IC18
SCC2692AC1I40	I	40	CERDIL	74;91	IC18 IC19
SCC2692AC1N24	N	24	PLDIL	74;91	IC18
SCC2692AC1N28	N	28	PLDIL	74;91	IC18 IC19
SCC2692AC1N40	N	40	PLDIL	74;91	IC18 IC19
SCC2698AC1A84	AC	84	PLCC	74;91	IC18 IC19
SCC2698AC1N64	NS	64	PLDIL	74;91	IC18 IC19
SCC63484CAA68	A	68	PLCC	74	DS
SCC63484CAN64	N	64	PLDIL	74	DS
SCC63484C4A64	AS	64	PLCC	74	–
SCC63484C4I64	IS	64	CERDIL	74	–
SCC63484C4N64	NS	64	PLDIL	74	–
SCC63484C6I64	IS	64	CERDIL	74	–
SCC63484C8A68	A	68	PLCC	74	DS
SCC63484C8I64	IS	64	CERDIL	74	–
SCC63484C8N64	NS	64	PLDIL	74	DS
SCC66470B	H	124	QFP	74;93	DS
SCC68070AAA84	SOT189	84	PLCC	74;108;112	DS
SCC68070AAQ120	SOT220	120	QFP	74;108;112	DS
SCC68070ABA84	SOT189	84	PLCC	74;108;112	DS
SCC68070ABQ120	SOT220	120	QFP	74;108;112	DS
SCC68070ACA84	SOT189	84	PLCC	74;108;112	DS

extended type no.	package code	no. of pins	pin position	catalogue page no.	handbook
SCC68070ACQ120	SOT220	120	QFP	74;108;112	DS
SCC68070CAA84	SOT189	84	PLCC	74;108;112	DS
SCC68070CAQ120	SOT220	120	QFP	74;108;112	DS
SCC68070CBA84	SOT189	84	PLCC	74;108;112	DS
SCC68070CBQ120	SOT220	120	QFP	74;108;112	DS
SCC68070CCA84	SOT189	84	PLCC	74;108;112	DS
SCC68070CCQ120	SOT220	120	QFP	74;108;112	DS
SCC68173P	SOT117	28	DIL	74	IC18
SCC68173T	SOT136A	28	SO28	74	IC18
SCC68692C1A44	A	44	PLCC	74;91	IC18 IC19
SCC68692C1N40	N	40	PLDIL	74;91	IC18 IC19
SCN2641CC1A28	AQ	28	PLCC	74;91	IC18 IC19
SCN2641CC1N24	NN	24	PLDIL	74;91	IC18 IC19
SCN2651CC1N28	NQ	28	PLDIL	74	IC18
SCN2652AC1A44	AX	44	PLCC	74;91	IC18
SCN2652AC1N40	NW	40	PLDIL	74;91	IC18
SCN2652AC2A44	AX	44	PLCC	74;91	IC18
SCN2652AC2N40	NW	40	PLDIL	74;91	IC18
SCN26562C4A52	A	52	PLCC	75	IC19
SCN26562C4I40	I	40	CERDIL	75	IC19
SCN26562C4I48	I	48	CERDIL	75	IC19
SCN26562C4N40	N	40	PLDIL	75	IC19
SCN26562C4N48	N	48	PLDIL	75	IC19
SCN2661AC1A28	AQ	28	PLCC	74;92	IC18 IC19
SCN2661AC1N24	NN	24	PLDIL	74;92	IC18
SCN2661AC1N28	NQ	28	PLDIL	74;92	IC18 IC19
SCN2661BC1A28	AQ	28	PLCC	74;92	IC18 IC19
SCN2661BC1N24	NN	24	PLDIL	74;92	IC18
SCN2661BC1N28	NQ	28	PLDIL	74;92	IC18 IC19
SCN2661CC1A28	A	28	PLCC	74;92	IC19
SCN2661CC1N24	NN	24	PLDIL	74;92	IC18
SCN2661CC1N28	NQ	28	PLDIL	74;92	IC18 IC19
SCN2672AC4N40	NW	40	PLDIL	74	IC18
SCN2672BC4A44	AX	44	PLCC	74	IC18
SCN2672BC4I40	IW	40	CERDIL	74	IC18
SCN2672BC4N40	NW	40	PLDIL	74	IC18
SCN2672TC5A44	A	44	PLCC	74	DS
SCN2672TC5I40	I	40	CERDIL	74	DS
SCN2672TC5N40	N	40	PLDIL	74	DS
SCN2674BC4I40	IW	40	CERDIL	74	DS
SCN2674BC4N40	NW	40	PLDIL	74	DS
SCN2674TC5A44	A	44	PLCC	74	DS
SCN2674TC5I40	I	40	CERDIL	74	DS
SCN2674TC5N40	N	40	PLDIL	74	DS
SCN2681AA1A44	A	44	PLCC	74;92	IC19 DS
SCN2681AA1I40	I	40	CERDIL	74;92	IC19 DS

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SCN2681AA1N40	N	40	PLDIL	74;92	IC19 DS
SCN2681AC1A44	AX	44	PLCC	74;92	IC18 IC19 DS
SCN2681AC1I28	IQ	28	CERDIL	74;92	IC18 IC19 DS
SCN2681AC1I40	IW	40	CERDIL	74;92	IC18 IC19 DS
SCN2681AC1N24	NN	24	PLDIL	74;92	IC18 IC19 DS
SCN2681AC1N28	NQ	28	PLDIL	74;92	IC18 IC19 DS
SCN2681AC1N40	NW	40	PLDIL	74;92	IC18 IC19 DS
SCN68000CAA68	AB	68	PLCC	74	IC18
SCN68000CAI64	IS	64	CERDIL	74	IC18
SCN68000C6I64	IS	64	CERDIL	74	IC18
SCN68000C6N64	NS	64	PLDIL	74	IC18
SCN68000C8A68	AB	68	PLCC	74	IC18
SCN68000C8N64	NS	64	PLDIL	74	IC18
SCN68562C4A52	AA	52	PLCC	75;92	IC18 IC19
SCN68562C4I48	IY	48	CERDIL	75;92	IC18 IC19
SCN68562C4N48	NY	48	PLDIL	75;92	IC18 IC19
SCN68681A1A44	A	44	PLCC	75;92	IC19 DS
SCN68681A1I40	I	40	CERDIL	75;92	IC19 DS
SCN68681A1N40	N	40	PLDIL	75;92	IC19 DS
SCN68681C1A44	AX	44	PLCC	75;92	IC18 IC19 DS
SCN68681C1I40	IW	40	CERDIL	75;92	IC18 IC19 DS
SCN68681C1N40	NW	40	PLDIL	75;92	IC18 IC19 DS
SC80C451ACA68	A	68	PLCC	69	DS
SC80C451ACN64	N	64	PLDIL	69	DS
SC80C451AGA68	A	68	PLCC	69	DS
SC80C451AGN64	N	64	PLDIL	69	DS
SC80C451CBA68	A	68	PLCC	69	DS
SC80C451CBN64	N	64	PLDIL	69	DS
SC80C451CCA68	A	68	PLCC	69	DS
SC80C451CCN64	N	64	PLDIL	69	DS
SC80C451CGA68	A	68	PLCC	69	DS
SC80C451CGN64	N	64	PLDIL	69	DS

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SC83C451ACA68	A	68	PLCC	70	DS
SC83C451ACN64	N	64	PLDIL	70	DS
SC83C451AGA68	A	68	PLCC	70	DS
SC83C451AGN64	N	64	PLDIL	70	DS
SC83C451CBA68	A	68	PLCC	70	DS
SC83C451CBN64	N	64	PLDIL	70	DS
SC83C451CCA68	A	68	PLCC	70	DS
SC83C451CCN64	N	64	PLDIL	70	DS
SC83C451CGA68	A	68	PLCC	70	DS
SC83C451CGN64	N	64	PLDIL	70	DS
SC83C751ACA28	A	28	PLCC	70	DS
SC83C751ACN24	N	24	PLDIL	70	DS
SC83C751AGA28	A	28	PLCC	70	DS
SC83C751AGN24	N	24	PLDIL	70	DS
SC83C751CBA28	A	28	PLCC	70	DS
SC83C751CBN24	N	24	PLDIL	70	DS
SC83C751CCA28	A	28	PLCC	70	DS
SC83C751CCN24	N	24	PLDIL	70	DS
SC83C751CGA28	A	28	PLCC	70	DS
SC83C751CGN24	N	24	PLDIL	70	DS
SC87C451ACA68	A	68	PLCC	70	DS
SC87C451ACN64	N	64	PLDIL	70	DS
SC87C451AGA68	A	68	PLCC	70	DS
SC87C451AGN64	N	64	PLDIL	70	DS
SC87C451CBA68	A	68	PLCC	70	DS
SC87C451CBI64	I	64	CERDIL	70	DS
SC87C451CBL68	L	68	LCCC	70	DS
SC87C451CBN64	N	64	PLDIL	70	DS
SC87C451CCA68	A	68	PLCC	70	DS
SC87C451CCI64	I	64	CERDIL	70	DS
SC87C451CCL68	L	68	LCCC	70	DS
SC87C451CCN64	N	64	PLDIL	70	DS
SC87C451CGA68	A	68	PLCC	70	DS
SC87C451CGI64	I	64	CERDIL	70	DS
SC87C451CGL68	L	68	LCCC	70	DS
SC87C451CGN64	N	64	PLDIL	70	DS
SC87C51ACA44	A	44	PLCC	70	DS
SC87C51ACN40	N	40	PLDIL	70	DS
SC87C51AGA44	A	44	PLCC	70	DS
SC87C51AGN40	N	40	PLDIL	70	DS
SC87C51CBF40	F	40	CERDIP	70	DS
SC87C51CBL44	L	44	LCCC	70	DS
SC87C51CBN40	N	40	PLDIL	70	DS
SC87C51CCA44	A	44	PLCC	70	DS
SC87C51CCF40	F	40	CERDIP	70	DS
SC87C51CCL44	L	44	LCCC	70	DS
SC87C51CCN40	N	40	PLDIL	70	DS
SC87C51CGA44	A	44	PLCC	70	DS
SC87C51CGF40	F	40	CERDIP	70	DS
SC87C51CGL44	L	44	LCCC	70	DS
SC87C51CGN40	N	40	PLDIL	70	DS
SC87C751–1A28	A	28	PLCC	70	DS
SC87C751–1F24	F	24	CERDIP	70	DS
SC87C751–1N24	N	24	PLDIL	70	DS
SC87C751–2A28	A	28	PLCC	70	DS
SC87C751–2N24	N	24	PLDIL	70	DS
SC87C751–3A28	A	28	PLCC	70	DS

extended type no.	package code	no. of pins	pin position	catalogue page no.	handbook
SC87C751-3F24	F	24	CERDIP	70	DS
SC87C751-3N24	N	24	PLDIL	70	DS
SC87C751-4A28	A	28	PLCC	70	DS
SC87C751-4F24	F	24	CERDIP	70	DS
SC87C751-4N24	N	24	PLDIL	70	DS
SC87C751-5A28	A	28	PLCC	70	DS
SC87C751-5N24	N	24	PLDIL	70	DS
SE4558FE	FE	8	CERDIP	78	IC11
SE5018F	FM	22	CERDIP	73;75;80	IC11
SE5018N	N	22	PLDIL	73;75;80	IC11
SE5019F	F	22	CERDIP	80	IC11
SE5030F	F	24	CERDIP	80	IC11
SE5060F	F	14	CERDIP	87	IC11
SE5105AFE	FE	8	CERDIP	79	IC11
SE5105FE	FE	8	CERDIP	79	IC11
SE5118F	F	22	CERDIP	80	IC11
SE5119F	FM	22	CERDIP	73;75;80	IC11
SE5205FE	FE	8	CERDIP	78;92	IC11 IC19
SE5205N	N	8	PLDIL	78;92	IC19
SE521F	FH	14	CERDIP	79	IC11
SE5212FE	FE	8	CERDIP	76;92	IC11 IC19
SE5212N	N	8	PLDIL	76;92	IC11 IC19
SE522F	F	14	CERDIP	79	IC11
SE527F	FH	14	CERDIP	79	IC11
SE527H	HF	10	HEADER	79	IC11
SE529F	FH	14	CERDIP	79	IC11
SE529H	HF	10	HEADER	79	IC11
SE530FE	FE	8	CERDIP	77	IC11
SE530N	NE	8	PLDIL	77	IC11
SE531FE	FE	8	CERDIP	77	IC11
SE531H	HE	8	HEADER	77	IC11
SE531N	N	8	PLDIL	77	IC11
SE532FE	FE	8	CERDIP	77	IC11
SE532N	NE	8	PLDIL	77	IC11
SE538FE	FE	8	CERDIP	77	IC11
SE538H	H	8	HEADER	77	IC11
SE538N	NE	8	PLDIL	77	IC11
SE5410F	F	16	CERDIP	80;95	IC11
SE5512FE	FE	8	CERDIP	78	IC11
SE5512N	NE	8	PLDIL	78	IC11
SE5514F	FH	14	CERDIP	78	IC11
SE5514N	NH	14	PLDIL	78	IC11
SE5521F	FK	18	CERDIP	85	IC11
SE5532AFE	FE	8	CERDIP	78	IC11
SE5532FE	FE	8	CERDIP	78	IC11
SE5534AFE	FE	8	CERDIP	78	IC11
SE5534AN	NE	8	PLDIL	78	IC11
SE5534FE	FE	8	CERDIP	78	IC11
SE5534N	NE	8	PLDIL	78	IC11
SE5535F	F	14	CERDIP	78	IC11
SE5535N	NE	8	PLDIL	78	IC11
SE5537FE	FE	8	CERDIP	87	–
SE5537N	N	8	PLDIL	87	IC11
SE5539F	FH	14	CERDIP	78;92;113	IC11

extended type no.	package code	no. of pins	pin position	catalogue page no.	handbook
SE5539F	FH	14	CERDIP	78;92;113	IC19
SE5539N	NH	14	PLDIL	78;92;113	IC11 IC19
SE555CF	F	8	CERDIP	88	IC11
SE555CFE	FE	8	CERDIP	88	IC11
SE555CN	NE	8	PLDIL	88	IC11
SE555F	FH	14	CERDIP	88	IC11
SE555FE	FE	8	CERDIP	88	IC11
SE555N	NE	8	PLDIL	88	IC11
SE556–1CF	F	14	CERDIP	88	IC11
SE556–1CN	N	14	PLDIL	88	IC11
SE556–1F	F	14	CERDIP	88	IC11
SE556–1N	N	14	PLDIL	88	IC11
SE556CN	NH	14	PLDIL	88	IC11
SE556F	FH	14	CERDIP	88	IC11
SE556N	NH	14	PLDIL	88	IC11
SE5560F	FJ	16	CERDIP	86	IC11
SE5560N	NJ	16	PLDIL	86	IC11
SE5561FE	FE	8	CERDIP	86	IC11
SE5561N	NE	8	PLDIL	86	IC11
SE5562F	FL	20	CERDIP	86	IC11
SE5562N	NL	20	PLDIL	86	–
SE5570F	FN	24	CERDIP	84	IC11
SE5570N	NN	24	PLDIL	84	IC11
SE558F	F	16	CERDIP	88	IC11
SE558N	NJ	16	PLDIL	88	IC11
SE564F	FJ	16	CERDIP	92;93	–
SE564I	IJ	16	CERDIL	92;93	–
SE564N	N	16	PLDIL	92;93	IC11 IC19
SE565F	FH	14	CERDIP	93	IC11
SE565N	N	14	PLDIL	93	IC11
SE566F	F	14	CERDIP	93	IC11
SE566N	NE	8	PLDIL	93	IC11
SE567F	FH	14	CERDIP	93;110	IC11 IC03
SE567FE	FE	8	CERDIP	93;110	IC11
SE567N	NE	8	PLDIL	93;110	IC11 IC03
SE592F14	FH	14	CERDIP	77;92;113	IC11 IC19
SE592F8	FE	8	CERDIP	77;92;113	IC11 IC19
SE592H	HF	10	HEADER	77;92;113	IC11 IC19
SE592N14	NH	14	PLDIL	77;92;113	–
SG1524CF	FJ	16	CERDIP	86	IC11
SG1524CN	NJ	16	PLDIL	86	IC11
SG1526F	FK	18	CERDIP	86	–
SG1526N	NK	18	PLDIL	86	–
SG2524CD	D	16	SO16	86	IC11
SG2524CF	F	16	CERDIP	86	IC11
SG2524CN	NJ	16	PLDIL	86	IC11
SG2526D	DK	18	SO20	86	–
SG2526F	FK	18	CERDIP	86	–
SG2526N	NK	18	PLDIL	86	–
SG3524CD	DJ	16	SO16	86	IC11

extended type no.	package code	no. of pins	pin position	catalogue page no.	handbook
SG3524CF	F	16	CERDIP	86	IC11
SG3524CN	NJ	16	PLDIL	86	IC11
SG3524D	DJ	16	SO16	86	–
SG3524F	FJ	16	CERDIP	86	–
SG3524N	NJ	16	PLDIL	86	–
SG3526D	DK	20	SO20	86	IC11
SG3526F	FK	18	CERDIP	86	IC11
SG3526N	NK	18	PLDIL	86	IC11
S8X360I	I	40	CERDIP	73	IC14
TAA263	SOT18/17	4	CYL	94	IC01
TAA320	SOT18/13	3	CYL	94	IC01
TAA320A	SOT18/13	3	CYL	94;100	IC01
TBA120U	SOT27	14	DIL	124	IC02
TBA920S	SOT38	16	DIL	125	IC02
TCA520B	SOT97	8	DIL	78	IC11
TCA520D	SOT96A	8	SO8	78	IC11
TDA1001B	SOT38	16	DIL	100	IC01
TDA1001BT	SOT109A	16	SO16	100	IC01
TDA1002A	SOT38	16	DIL	94	IC01
TDA1010A	SOT110B	9	SIL	94	IC01
TDA1011	SOT110B	9	SIL	94	IC01
TDA1013B	SOT110B	9	SIL	94;124	–
TDA1015	SOT110B	9	SIL	94;124	IC01 IC02
TDA1015T	SOT96A	8	SO8	94;124	IC01 IC02
TDA1016	SOT38	16	DIL	94	IC01
TDA1020	SOT110B	9	SIL	94	IC01
TDA1023	SOT38	16	DIL	86	IC11
TDA1023T	SOT109A	16	SO16	86	–
TDA1029	SOT38	16	DIL	95;124	IC01 IC02
TDA1059B	SOT32	3	SIL	103	IC01
TDA1060	SOT38	16	DIL	86	IC11
TDA1060A	SOT38	16	DIL	86	IC11
TDA1060B	SOT74	16	DIL	86	IC11
TDA1060T	SOT109A	16	SO16	86	IC11
TDA1072A	SOT38	16	DIL	103	IC01
TDA1072AT	SOT109A	16	SO16	103	DS
TDA1074A	SOT102H	18	DIL	95	IC01
TDA1082	SOT38	16	DIL	115	IC02
TDA1432P	SOT38Z	16	DIL	80	–
TDA1432T	SOT109A	16	SO16	80	–
TDA1510A	SOT141C	13	SBD	94	IC01
TDA1512A	SOT131CE	9	SIL	94;124	–
TDA1512AQ	SOT157	9	SBD	94;124	–
TDA1514	SOT131A	9	SIL	94;96;124	IC01
TDA1514A	SOT131A	13	SIL	94;96;124	DS
TDA1515B	SOT141CE	13	SBD	94	–
TDA1516Q	SOT141CEA	13	SBD	94	IC01
TDA1517	SOT110B	9	SIL	94	DS
TDA1518Q	SOT141CEA	13	SBD	94	IC01
TDA1519	SOT110B	9	SIL	94	DS
TDA1519A	SOT131B	9	SIL	94	–
TDA1519B	SOT110B	9	SIL	94	–
TDA1520B	SOT131CE	9	SIL	94;125	IC02
TDA1520BQ	SOT157CE	9	SBD	94;125	–

extended type no.	package code	no. of pins	pin position	catalogue page no.	handbook
TDA1521	SOT131	9	SIL	94;125	IC01 IC02
TDA1521A	SOT110B	9	SIL	94;125	IC01 IC02
TDA1521Q	SOT157	9	SBD	94;125	IC01 IC02
TDA1522	SOT142	9	SIL	94	IC01
TDA1524A	SOT102H	18	DIL	95;125	IC01 IC02
TDA1525	SOT102H	18	DIL	95;125	DS
TDA1534	SOT117	28	DIL	80;95;114	IC01 IC02
TDA1535	SOT38WE2	16	DIL	87;94	IC01
TDA1541A	SOT117	28	DIL	80;94;96;114	IC02
TDA1542	SOT117	28	DIL	96	DS
TDA1543	SOT97	8	DIL	80;95;96;114	DS
TDA1543A	SOT97	8	DIL	80;95;96;114	–
TDA1572	SOT102H	18	DIL	103	DS
TDA1572T	SOT163A	20	SO20	103	DS
TDA1574	SOT102H	18	DIL	103;105	IC01
TDA1574T	SOT163A	20	SO20	103;105	DS
TDA1576	SOT102H	18	DIL	103	IC01 IC17
TDA1578A	SOT102H	18	DIL	105	IC01
TDA1579	SOT102H	18	DIL	95	IC01
TDA1579T	SOT163A	20	SO20	95	IC01
TDA1589	SOT102H	18	DIL	95	IC01
TDA1596	SOT102H	18	DIL	103	DS
TDA1596T	SOT163A	20	SO20	103	DS
TDA1598	SOT102H	18	DIL	105	IC01
TDA1600	SOT101B	24	DIL	95	IC01
TDA1721P	SOT38Z	16	DIL	73	–
TDA1721T	SOT109A	16	SO16	73	–
TDA2515	SOT129	40	DIL	123	–
TDA2543	SOT102H	18	DIL	125	IC02
TDA2545A	SOT38	16	DIL	125	IC02
TDA2546A	SOT102H	18	DIL	125	IC02
TDA2549	SOT101A	24	DIL	127	IC02
TDA2555	SOT102H	18	DIL	125	IC02
TDA2556	SOT101B	24	DIL	125	IC02
TDA2557	SOT102H	18	DIL	125	IC02
TDA2577A	SOT102H	18	DIL	126	IC02
TDA2578A	SOT102H	18	DIL	126	IC02
TDA2579A	SOT102H	18	DIL	126	–
TDA2582	SOT38	16	DIL	123	IC02
TDA2582Q	SOT58	16	QIL	123	IC02
TDA2593	SOT38	16	DIL	125	IC02
TDA2594	SOT102H	18	DIL	125	IC02
TDA2595	SOT102H	18	DIL	125	IC02
TDA2611A	SOT110B	9	SIL	94;125	IC01 IC02
TDA2613	SOT110B	9	SIL	94;125	IC01 IC02
TDA2653A	SOT141B	13	SBD	125	IC02
TDA2655B	SOT150	12	DIL	125	IC02
TDA2658	SOT141B	13	SBD	125	IC02
TDA2795	SOT102H	18	DIL	125	IC02

extended type no.	package code	no. of pins	pin position	catalogue page no.	handbook
TDA3047P	SOT38	16	DIL	104;124	IC01 IC02
TDA3047T	SOT162A	16	SO16L	104;124	IC01 IC02
TDA3048P	SOT38	16	DIL	104;124	IC01 IC02
TDA3048T	SOT162A	16	SO16L	104;124	IC01 IC02
TDA3501	SOT117	28	DIL	113	IC02
TDA3505	SOT117	28	DIL	113	IC02
TDA3506	SOT117	28	DIL	113	IC02
TDA3507	SOT117	28	DIL	113	IC02
TDA3510	SOT101A	24	DIL	113	IC02
TDA3561A	SOT117	28	DIL	113	IC02
TDA3564	SOT101A	24	DIL	113	IC02
TDA3565	SOT102H	18	DIL	113	IC02
TDA3566	SOT117	28	DIL	113	IC02
TDA3567	SOT102H	18	DIL	113	IC02
TDA3569	SOT146EE7	20	DIL	113	IC02
TDA3586	SOT117	28	DIL	126	IC02
TDA3590A	SOT101B	24	DIL	113	IC02
TDA3592A	SOT101B	24	DIL	113	IC02
TDA3645	–	–	–	86	–
TDA3653B	SOT110B	9	SIL	125	–
TDA3653CQ	SOT131	9	SIL	125	–
TDA3654	SOT131	9	SIL	125	IC02
TDA3654Q	SOT157	9	SBD	125	IC02
TDA3724	SOT102K	18	DIL	123	IC02
TDA3725	SOT102K	18	DIL	123	IC02
TDA3730	SOT117	28	DIL	123	IC02
TDA3740	SOT117	28	DIL	123	IC02
TDA3755	SOT102H	18	DIL	123	IC02
TDA3760	SOT117	28	DIL	123	IC02
TDA3765	SOT117	28	DIL	123	IC02
TDA3766	SOT117	28	DIL	123	–
TDA3771	SOT102H	18	DIL	123	IC02
TDA3780	SOT102H	18	DIL	123	IC02
TDA3791	SOT38	16	DIL	123	IC02
TDA3800G	SOT117	28	DIL	125	IC02
TDA3800GS	SOT117	28	DIL	125	IC02
TDA3803A	SOT117	28	DIL	125	IC02
TDA3806	SOT102H	18	DIL	125	IC02
TDA3808	SOT38	16	DIL	125	IC02
TDA3810	SOT102H	18	DIL	95;125	IC01 IC02
TDA3825	SOT27	14	DIL	125	DS
TDA3826	SOT27	14	DIL	125	DS
TDA4500	SOT117	28	DIL	124	IC02
TDA4501	SOT117	28	DIL	124	IC02
TDA4502A	SOT117	28	DIL	124	DS
TDA4503	SOT117	28	DIL	124	IC02
TDA4504	SOT201	32	DIL	124	–
TDA4505E	SOT117	28	DIL	124	–
TDA4505M	SOT117	28	DIL	124	–
TDA4510	SOT38	16	DIL	113	IC02
TDA4532	SOT117	28	DIL	113	IC02

extended type no.	package code	no. of pins	pin position	catalogue page no.	handbook
TDA4555	SOT117	28	DIL	113	IC02
TDA4556	SOT117	28	DIL	113	IC02
TDA4560	SOT102H	18	DIL	113	IC02
TDA4565	SOT102H	18	DIL	113	–
TDA4570	SOT38	16	DIL	113	IC02
TDA4580	SOT117	28	DIL	113	IC02
TDA4710H	SOT196A	48	QFP	123	–
TDA4720	SOT38	16	DIL	123	DS
TDA4720T	SOT109A	16	SO16	123	DS
TDA4730H	SOT196A	48	QFP	123	–
TDA4770H	–	–	–	123	–
TDA4770HT	–	–	–	123	–
TDA5030A	SOT102H	18	DIL	127	IC02
TDA5030AT	SOT163A	20	SO20	127	IC02
TDA5040T	SOT96A	8	SO8	84;103	DS
TDA5045T	SOT96A	8	SO8	84;103	–
TDA5140	SOT102	18	DIL	84;103	–
TDA5230T	SOT137A	24	SO24	127	IC02
TDA5330T	SOT136A	28	SO28	127	DS
TDA5708	SOT117	28	DIL	96	IC01
TDA5709	SOT146	20	DIL	96	IC01
TDA6100	SOT110B	9	SIL	113	–
TDA6800	SOT97	8	DIL	127	–
TDA6800T	SOT96A	8	SO8	127	–
TDA7000	SOT102H	18	DIL	103	IC01
TDA7010T	SOT109A	16	SO16	103	IC01
TDA7021T	SOT109A	16	SO16	103	IC01
TDA7030T	SOT136A	28	SO28	103;105	IC01
TDA7040T	SOT96A	8	SO8	103;105	IC01
TDA7050	SOT97	8	DIL	94;103;106;110	IC01 IC03 IC17
TDA7050T	SOT96A	8	SO8	94;103;106;110	IC01 IC03 IC17
TDA7052	SOT97	8	DIL	94;103;106;110; 112	IC03 IC17
TDA7053	SOT38	16	DIL	94;103	DS
TDA8305	SOT117	28	DIL	124	–
TDA8340	SOT38	16	DIL	127	IC02
TDA8340Q	SOT58	16	QIL	127	IC02
TDA8341	SOT38	16	DIL	127	IC02
TDA8341Q	SOT58	16	QIL	127	IC02
TDA8370	SOT117	28	DIL	118;126	DS
TDA8372A	SOT101B	24	DIL	126	–
TDA8380	SOT38	16	DIL	123	–
TDA8390	SOT201	32	DIL	114	–
TDA8405	SOT117	28	DIL	119;125	IC02 IC12
TDA8420	SOT117	28	DIL	95;99;119;125	IC01 IC02 IC12
TDA8421	SOT117	28	DIL	95;99;119;125	IC12
TDA8425	SOT146	20	DIL	95;99;119;125	DS
TDA8432	SOT101BE	24	DIL	115;125	–
TDA8433	SOT101	24	DIL	115;119;126	–
TDA8440	SOT102H	18	DIL	119;127	IC02

extended type no.	package code	no. of pins	pin position	catalogue page no.	handbook
TDA8440	SOT102H	18	DIL	119;127	IC12
TDA8442	SOT38	16	DIL	114;119	DS
TDA8443	SOT101B	24	DIL	114;119;127	IC02 IC12
TDA8443A	SOT101B	24	DIL	114;119;127	IC02 IC12
TDA8444	SOT38	16	DIL	95;114;119	DS
TDA8451	SOT38	16	DIL	114	–
TDA8452	SOT38	16	DIL	114	–
TDA8461P	SOT129	40	DIL	114;119	DS
TDA8490	SOT102H	18	DIL	114	DS
TDA8702	SOT38D	16	DIL	80;114	–
TDA8702T	SOT162A	16	SO16L	80;114	–
TDA8703	SOT101	24	DIL	80;114	–
TDA8703T	SOT137A	24	SO24	80;114	–
TDA8706	SOT146	20	DIL	114	–
TDA8708	SOT117	28	DIL	114	–
TDA8808AT	SOT136A	28	SO28	96	DS
TDA8808T	SOT136A	28	SO28	96	DS
TDA8809T	SOT136A	28	SO28	96	DS
TDA9045	SOT102H	18	DIL	127	IC02
TDA9080	SOT117	28	DIL	114	DS
TDB1080	SOT38	16	DIL	93;103	IC11
TDB1080T	SOT109A	16	SO16	93;103	–
TDD1601	SOT101B	24	DIL	95	IC01
TDD1742T	SOT136A	28	SO28	97;105;110	IC01 IC17
TDE8715D	SOT133B	18	CERDIP	114	–
TEA0652	SOT102H	18	DIL	97	IC01
TEA0653T	SOT163A	20	SO20	97	IC01
TEA0654	SOT101A	24	DIL	97	IC01
TEA0657	SOT101A	24	DIL	97	DS
TEA0665	SOT117	28	DIL	97	IC01
TEA0665T	SOT136A	28	S028	97	IC01
TEA0666	SOT117	28	DIL	97	DS
TEA0666T	SOT136A	28	S028	97	DS
TEA0670T	SOT136A	28	SO28	97;103	IC01
TEA1012	SOT38	16	DIL	84	DS
TEA1017	SOT102H	18	DIL	81;83	IC11
TEA1039	SOT110B	9	SIL	123	IC02 IC11
TEA1042	SOT101A	24	DIL	111	IC03
TEA1060	SOT102	18	DIL	111	IC03
TEA1061	SOT102	18	DIL	111	IC03
TEA1063P	SOT146	20	DIL	111	DS
TEA1063T	SOT163A	20	SO20	111	DS
TEA1064	SOT146	20	DIL	111	IC03
TEA1064T	SOT163A	20	SO20	111	IC03
TEA1066T	SOT163A	20	SO20	111	IC03
TEA1067	SOT102	18	DIL	111	IC03
TEA1067T	SOT163A	20	SO20	111	IC03
TEA1068	SOT102	18	DIL	111	IC03
TEA1068T	SOT163A	20	SO20	111	IC03
TEA1081	SOT97	8	DIL	110	IC03
TEA1081T	SOT96A	8	SO8	110	IC03
TEA2000	SOT102H	18	DIL	73;123	IC02 IC14

extended type no.	package code	no. of pins	pin position	catalogue page no.	handbook
TEA5500	SOT38	16	DIL	92	DS
TEA5500T	SOT162A	16	SO16L	92	DS
TEA5551T	SOT109A	16	SO16	103	DS
TEA5560	SOT142	9	SIL	103	IC01
TEA5570	SOT38	16	DIL	103	IC01
TEA5580	SOT38	16	DIL	105	IC01
TEA5581	SOT38	16	DIL	105	IC01
TEA5581T	SOT162A	16	SO16L	105	IC01
TEA5591	SOT146	20	DIL	103	IC01
TEA6000	SOT102H	18	DIL	99;104	IC01 IC12
TEA6100	SOT146	20	DIL	99;104	IC01 IC12
TEA6200	SOT146	20	DIL	103	DS
TEA6300	SOT117	28	DIL	95;99	DS
TEA6300T	SOT136A	28	SO28	95;99	DS
TEA6310T	SOT136A	28	SO28	95;99	DS
TSA5510	SOT102	18	DIL	127	DS
TSA5510T	SOT109A	16	SO16	127	DS
TSA6057	SOT38	16	DIL	97;105	IC01 IC02 IC12
UAA2033T	SOT136A	28	SO28	112	IC01 IC17
µA723CD	DH	14	SO14	86	IC11
µA723CF	FH	14	CERDIP	86	IC11
µA723CN	NH	14	PLDIL	86	IC11
µA723F	FH	14	CERDIP	86	IC11
µA723N	NH	14	PLDIL	86	IC11
µA733CF	FH	14	CERDIP	76;113	IC11
µA733CN	NH	14	PLDIL	76;113	IC11
µA733F	F	14	CERDIP	76;113	IC11
µA733N	NH	14	PLDIL	76;113	IC11
µA741CD	DE	8	SO8	78	IC11
µA741CF	F	8	CERDIP	78	IC11
µA741CN	NE	8	PLDIL	78	IC11
µA741F	F	8	CERDIP	78	IC11
µA741FE	FE	8	CERDIP	78	–
µA741N	NE	8	PLDIL	78	IC11
µA747CD	DH	14	SO14	78	IC11
µA747CF	FH	14	CERDIP	78	IC11
µA747CN	NH	14	PLDIL	78	IC11
µA747F	FH	14	CERDIP	78	IC11
µA747N	NH	14	PLDIL	78	IC11
µA758N	NJ	16	PLDIL	105	IC11
UBA1094	SOT27	14	DIL	111	–
ULN2003D	DJ	16	SO16	81;83	IC11
ULN2003F	FJ	16	CERDIP	81;83	IC11
ULN2003N	NJ	16	PLDIL	81;83	IC11
ULN2004D	DJ	16	SO16	81;83	IC11
ULN2004F	F	16	CERDIP	81;83	IC11
ULN2004N	NJ	16	PLDIL	81;83	IC11
UMA1000T	SOT136A	28	SO28	93;108;110	IC17
UMA1010T	SOT136A	28	SO28	93;108;110	IC17
UMA1012T	SOT136A	28	SO28	108;110	–
100101F	FN	24	CERDIP	61	IC08
100101Y	YN	24	HLCC/W	61	IC08

extended type no.	package code	no. of pins	pin position	catalogue page no.	handbook
100102F	FN	24	CERDIP	61	IC08
100102Y	YN	24	HLCC/W	61	IC08
100107F	FN	24	CERDIP	60	IC08
100107Y	YN	24	HLCC/W	60	IC08
100112F	FN	24	CERDIP	60	IC08
100112Y	YN	24	HLCC/W	60	IC08
100113F	FN	24	CERDIP	60	IC08
100113Y	YN	24	HLCC/W	60	IC08
100114F	FN	24	CERDIP	61	IC08
100114Y	YN	24	HLCC/W	61	IC08
100117F	FN	24	CERDIP	60	IC08
100117Y	YN	24	HLCC/W	60	IC08
100118F	FN	24	CERDIP	60	IC08
100118Y	YN	24	HLCC/W	60	IC08
100122F	FN	24	CERDIP	60	IC08
100122Y	YN	24	HLCC/W	60	IC08
100123F	FN	24	CERDIP	60	IC08
100123Y	YN	24	HLCC/W	60	IC08
100126F	FN	24	CERDIP	60	IC08
100126Y	YN	24	HLCC/W	60	IC08
100131F	FN	24	CERDIP	60	IC08
100131Y	YN	24	HLCC/W	60	IC08
100136F	FN	24	CERDIP	61	IC08
100136Y	YN	24	HLCC/W	61	IC08
100141F	FN	24	CERDIP	61	IC08
100141Y	YN	24	HLCC/W	61	IC08
100149AF	F	16	CERDIP	61	IC10
100149F	FJ	16	CERDIP	61	IC10
100150F	FN	24	CERDIP	60	IC08
100150Y	YN	24	HLCC/W	60	IC08
100151F	FN	24	CERDIP	60	IC08
100151Y	YN	24	HLCC/W	60	IC08
100155F	FN	24	CERDIP	61	IC08
100155Y	YN	24	HLCC/W	61	IC08
100158F	FN	24	CERDIP	61	IC08
100158Y	YN	24	HLCC/W	61	IC08
100160F	FN	24	CERDIP	60	IC08
100160Y	YN	24	HLCC/W	60	IC08
100163F	FN	24	CERDIP	61	IC08
100163Y	YN	24	HLCC/W	61	IC08
100164F	FN	24	CERDIP	61	IC08
100164Y	YN	24	HLCC/W	61	IC08
100165F	FN	24	CERDIP	60	IC08
100165Y	YN	24	HLCC/W	60	IC08
100166F	FN	24	CERDIP	60	IC08
100166Y	YN	24	HLCC/W	60	IC08
100170F	FN	24	CERDIP	60	IC08
100170Y	YN	24	HLCC/W	60	IC08
100171F	FN	24	CERDIP	61	IC08
100171Y	YN	24	HLCC/W	61	IC08
100175F	FJ	16	CERDIP	61	IC08
100179F	FN	24	CERDIP	60	IC08
100179Y	YN	24	HLCC/W	60	IC08
100180F	FN	24	CERDIP	60	IC08
100180Y	YN	24	HLCC/W	60	IC08
100181F	FN	24	CERDIP	60	IC08
100181Y	YN	24	HLCC/W	60	IC08

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100231F	FN	24	CERDIP	60	IC08
100231Y	YN	24	HLCC/W	60	IC08
100255D	SOT74B	16	CERDIP	61	DS
100422BF	F	24	CERDIP	61	IC10
100422CF	F	24	CERDIP	61	IC10
100470AF	F	18	CERDIP	61	IC10
100474AF	F	24	CERDIP	61	IC10
10100F	FJ	16	CERDIP	56	IC08
10100N	NJ	16	PLDIL	56	IC08
10101F	FJ	16	CERDIP	56	IC08
10101N	NJ	16	PLDIL	56	IC08
10102F	FJ	16	CERDIP	56	IC08
10102N	NJ	16	PLDIL	56	IC08
10103F	FJ	16	CERDIP	56	IC08
10103N	NJ	16	PLDIL	56	IC08
10104D	DJ	16	SO16	56	IC08
10104F	FJ	16	CERDIP	56	IC08
10104N	NJ	16	PLDIL	56	IC08
10105F	FJ	16	CERDIP	56	IC08
10105N	NJ	16	PLDIL	56	IC08
10106F	FJ	16	CERDIP	56	IC08
10106N	NJ	16	PLDIL	56	IC08
10107D	DJ	16	SO16	56	IC08
10107F	FJ	16	CERDIP	56	IC08
10107N	NJ	16	PLDIL	56	IC08
10108F	FJ	16	CERDIP	56	IC08
10108N	NJ	16	PLDIL	56	IC08
10109F	FJ	16	CERDIP	56	IC08
10109N	NJ	16	PLDIL	56	IC08
10110F	FJ	16	CERDIP	55	IC08
10110N	NJ	16	PLDIL	55	IC08
10111F	FJ	16	CERDIP	55	IC08
10111N	NJ	16	PLDIL	55	IC08
10113F	FJ	16	CERDIP	56	IC08
10113N	NJ	16	PLDIL	56	IC08
10114F	FJ	16	CERDIP	57	IC08
10114N	NJ	16	PLDIL	57	IC08
10115F	FJ	16	CERDIP	57	IC08
10115N	NJ	16	PLDIL	57	IC08
10116D	DJ	16	SO16	57	IC08
10116F	FJ	16	CERDIP	57	IC08
10116N	NJ	16	PLDIL	57	IC08
10117D	DJ	16	SO16	56	IC08
10117F	FJ	16	CERDIP	56	IC08
10117N	NJ	16	PLDIL	56	IC08
10118N	NJ	16	PLDIL	56	IC08
10119N	NJ	16	PLDIL	56	IC08
10123N	NJ	16	PLDIL	55	IC08
10124F	FJ	16	CERDIP	57	IC08
10124N	NJ	16	PLDIL	57	IC08
10125F	FJ	16	CERDIP	57	IC08
10125N	NJ	16	PLDIL	57	IC08
10130N	NJ	16	PLDIL	56	IC08
10131F	FJ	16	CERDIP	55	IC08
10131N	NJ	16	PLDIL	55	IC08
10133F	FJ	16	CERDIP	56	IC08
10133N	NJ	16	PLDIL	56	IC08

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10134N	NJ	16	PLDIL	56;57	IC08
10135F	FJ	16	CERDIP	55	IC08
10135N	NJ	16	PLDIL	55	IC08
10136F	FJ	16	CERDIP	55	IC08
10136N	NJ	16	PLDIL	55	IC08
10137F	FJ	16	CERDIP	55	IC08
10137N	NJ	16	PLDIL	55	IC08
10141F	FJ	16	CERDIP	57	IC08
10141N	NJ	16	PLDIL	57	IC08
10149AF	F	16	CERDIP	57	IC10
10149F	FJ	16	CERDIP	57	IC10
10158N	NJ	16	PLDIL	57	IC08
10159F	FJ	16	CERDIP	57	IC08
10159N	NJ	16	PLDIL	57	IC08
10160F	FJ	16	CERDIP	55	IC08
10160N	NJ	16	PLDIL	55	IC08
10161F	FJ	16	CERDIP	55	IC08
10161N	NJ	16	PLDIL	55	IC08
10162N	NJ	16	PLDIL	55	IC08
10164F	FJ	16	CERDIP	57	IC08
10164N	NJ	16	PLDIL	57	IC08
10165N	NJ	16	PLDIL	55	IC08
10171N	NJ	16	PLDIL	55	IC08
10172N	NJ	16	PLDIL	55	IC08
10173N	NJ	16	PLDIL	57	IC08
10174F	FJ	16	CERDIP	57	IC08
10174N	NJ	16	PLDIL	57	IC08
10175N	NJ	16	PLDIL	56	IC08
10176F	FJ	16	CERDIP	55	IC08
10176N	NJ	16	PLDIL	55	IC08
10179N	NJ	16	PLDIL	55	IC08
10181F	FN	24	CERDIP	55	IC08
10181N	NN	24	PLDIL	55	IC08
10188F	FJ	16	CERDIP	55	IC08
10188N	NJ	16	PLDIL	55	IC08
10189N	NJ	16	PLDIL	56	IC08
10192F	FJ	16	CERDIP	55	IC08
10192N	NJ	16	PLDIL	55	IC08
10210F	FJ	16	CERDIP	55	IC08
10210N	NJ	16	PLDIL	55	IC08
10211F	FJ	16	CERDIP	55	IC08
10211N	NJ	16	PLDIL	55	IC08
10216F	FJ	16	CERDIP	55	IC08
10216N	NJ	16	PLDIL	55	IC08
10231F	FJ	16	CERDIP	55	IC08
10231N	NJ	16	PLDIL	55	IC08
10422BF	F	24	CERDIP	57	IC08 IC10
10422CF	F	24	CERDIP	57	IC08 IC10
23 101PB	FO75	64	PGA	63	DS
23 101PBH	FO99	64	PGA	63	DS
231 101PB	FO75	64	PGA	63	DS
231 101PBH	FO99	64	PGA	63	DS
241 141PBK	FO108	144	PGA	73	DS
241 141PBKH	FO128	144	PGA	73	DS
27C256–17FA	FQ	28	CERDIP	65	IC10

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27C256–20A	A	32	PLCC	65	DS
27C256–20FA	FQ	28	CERDIP	65	DS
27C256–20N	NQ	28	PLDIL	65	DS
27C256–25A	A	32	PLCC	65	DS
27C256–25FA	FQ	28	CERDIP	65	DS
27C256–25N	NQ	28	PLDIL	65	DS
27C64A–20A	A	32	PLCC	65	DS
27C64A–20FA	FQ	28	CERDIP	65	DS
27C64A–20N	NQ	28	PLDIL	65	DS
27C64A–25A	A	32	PLCC	65	DS
27C64A–25FA	FQ	28	CERDIP	65	DS
27C64A–25N	NQ	28	PLDIL	65	DS
27HC641–45FA	FN	24	CERDIP	65	DS
27HC641–55FA	FN	24	CERDIP	65	DS
74ACT11000D	D	16	SO16	38	IC07
74ACT11000N	N	16	PLDIL	38	IC07
74ACT11002D	D	16	SO16	38	IC07
74ACT11002N	N	16	PLDIL	38	IC07
74ACT11004D	D	20	SO20	39	IC07
74ACT11004N	N	20	PLDIL	39	IC07
74ACT11008D	D	16	SO16	38	IC07
74ACT11008N	N	16	PLDIL	38	IC07
74ACT11010D	D	16	SO16	38	IC07
74ACT11010N	N	16	PLDIL	38	IC07
74ACT11011D	D	16	SO16	38	IC07
74ACT11011N	N	16	PLDIL	38	IC07
74ACT11013D	D	14	SO14	38;40	–
74ACT11013N	N	14	PLDIL	38;40	–
74ACT11014D	D	20	SO20	39;40	–
74ACT11014N	N	20	PLDIL	39;40	–
74ACT11020D	D	14	SO14	38	IC07
74ACT11020N	N	14	PLDIL	38	IC07
74ACT11021D	D	14	SO14	38	IC07
74ACT11021N	N	14	PLDIL	38	IC07
74ACT11027D	D	16	SO16	38	IC07
74ACT11027N	N	16	PLDIL	38	IC07
74ACT11030D	D	14	SO14	38	IC07
74ACT11030N	N	14	PLDIL	38	IC07
74ACT11032D	D	16	SO16	38;40	IC07
74ACT11032N	N	16	PLDIL	38;40	IC07
74ACT11034D	D	20	SO20	39	–
74ACT11034N	N	20	PLDIL	39	–
74ACT11051D	D	14	SO14	38	–
74ACT11051N	N	14	PLDIL	38	–
74ACT11064D	D	14	SO14	38	–
74ACT11064N	N	14	PLDIL	38	–
74ACT11074D	D	14	SO14	37	IC07
74ACT11074N	N	14	PLDIL	37	IC07
74ACT11086D	D	16	SO16	38	–
74ACT11086N	N	16	PLDIL	38	–
74ACT11109D	D	16	SO16	37	IC07
74ACT11109N	N	16	PLDIL	37	IC07
74ACT11112D	D	16	SO16	37	–
74ACT11112N	N	16	PLDIL	37	–
74ACT11132D	D	16	SO16	38	–
74ACT11132N	N	16	PLDIL	38	–
74ACT11138D	D	16	SO16	36	IC07

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74ACT11138N	N	16	PLDIL	36	IC07
74ACT11139D	D	16	SO16	36	–
74ACT11139N	N	16	PLDIL	36	–
74ACT11150D	D	24	SO24	39	–
74ACT11150N	N	24	PLDIL	39	–
74ACT11151D	D	16	SO16	39	–
74ACT11151N	N	16	PLDIL	39	–
74ACT11153D	D	16	SO16	39	–
74ACT11153N	N	16	PLDIL	39	–
74ACT11154D	D	24	SO24	36	–
74ACT11154N	N	24	PLDIL	36	–
74ACT11157D	D	20	SO20	39	–
74ACT11157N	N	20	PLDIL	39	–
74ACT11158D	D	20	SO20	39	IC07
74ACT11158N	N	20	PLDIL	39	IC07
74ACT11160D	D	20	SO20	35	IC07
74ACT11160N	N	20	PLDIL	35	IC07
74ACT11161D	D	20	SO20	35	–
74ACT11161N	N	20	PLDIL	35	–
74ACT11162D	D	20	SO20	35	IC07
74ACT11162N	N	20	PLDIL	35	IC07
74ACT11163D	D	20	SO20	35	–
74ACT11163N	N	20	PLDIL	35	–
74ACT11168D	D	20	SO20	35	–
74ACT11168N	N	20	PLDIL	35	–
74ACT11169D	D	20	SO20	35	–
74ACT11169N	N	20	PLDIL	35	–
74ACT11174D	D	20	SO20	37	–
74ACT11174N	N	20	PLDIL	37	–
74ACT11175D	D	20	SO20	37	–
74ACT11175N	N	20	PLDIL	37	–
74ACT11181D	D	28	SO28	35	–
74ACT11181N	N	28	PLDIL	35	–
74ACT11190D	D	20	SO20	35	–
74ACT11190N	N	20	PLDIL	35	–
74ACT11191D	D	20	SO20	35	–
74ACT11191N	N	20	PLDIL	35	–
74ACT11192D	D	20	SO20	35	–
74ACT11192N	N	20	PLDIL	35	–
74ACT11193D	D	20	SO20	35	–
74ACT11193N	N	20	PLDIL	35	–
74ACT11194D	D	20	SO20	39	–
74ACT11194N	N	20	PLDIL	39	–
74ACT11208D	D	20	SO20	36	–
74ACT11208N	N	20	PLDIL	36	–
74ACT11238D	D	16	SO16	36	IC07
74ACT11238N	N	16	PLDIL	36	IC07
74ACT11239D	D	16	SO16	36	–
74ACT11239N	N	16	PLDIL	36	–
74ACT11240D	D	24	SO24	35;36	IC07
74ACT11240N	N	24	PLDIL	35;36	IC07
74ACT11241D	D	24	SO24	35;36	IC07
74ACT11241N	N	24	PLDIL	35;36	IC07
74ACT11244D	D	24	SO24	35;36	IC07
74ACT11244N	N	24	PLDIL	35;36	IC07
74ACT11245D	D	24	SO24	40	IC07
74ACT11245N	N	24	PLDIL	40	IC07

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74ACT11250D	D	24	SO24	39	–
74ACT11250N	N	24	PLDIL	39	–
74ACT11251D	D	16	SO16	39	–
74ACT11251N	N	16	PLDIL	39	–
74ACT11253D	D	16	SO16	39	IC07
74ACT11253N	N	16	PLDIL	39	IC07
74ACT11257D	D	20	SO20	39	–
74ACT11257N	N	20	PLDIL	39	–
74ACT11258D	D	20	SO20	39	–
74ACT11258N	N	20	PLDIL	39	–
74ACT11269D	D	28	SO28	36	–
74ACT11269N	N	28	PLDIL	36	–
74ACT11273D	D	24	SO24	37	–
74ACT11273N	N	24	PLDIL	37	–
74ACT11280D	D	14	SO14	35	–
74ACT11280N	N	14	PLDIL	35	–
74ACT11286D	D	14	SO14	35	–
74ACT11286N	N	14	PLDIL	35	–
74ACT11299D	D	24	SO24	39	–
74ACT11299N	N	24	PLDIL	39	–
74ACT11323D	D	24	SO24	39	–
74ACT11323N	N	24	PLDIL	39	–
74ACT11352D	D	16	SO16	39	–
74ACT11352N	N	16	PLDIL	39	–
74ACT11353D	D	16	SO16	39	IC07
74ACT11353N	N	16	PLDIL	39	IC07
74ACT11373D	D	24	SO24	37;39	IC07
74ACT11373N	N	24	PLDIL	37;39	IC07
74ACT11374D	D	24	SO24	37	IC07
74ACT11374N	N	24	PLDIL	37	IC07
74ACT11377D	D	24	SO24	37	–
74ACT11377N	N	24	PLDIL	37	–
74ACT11378D	D	20	SO20	37	–
74ACT11378N	N	20	PLDIL	37	–
74ACT11379D	D	20	SO20	37	–
74ACT11379N	N	20	PLDIL	37	–
74ACT11461D	D	28	SO28	36	–
74ACT11461N	N	28	PLDIL	36	–
74ACT11463D	D	28	SO28	36	–
74ACT11463N	N	28	PLDIL	36	–
74ACT11469D	D	28	SO28	36	–
74ACT11469N	N	28	PLDIL	36	–
74ACT11470D	D	28	SO28	40	–
74ACT11470N	N	28	PLDIL	40	–
74ACT11471D	D	28	SO28	40	–
74ACT11471N	N	28	PLDIL	40	–
74ACT11472D	D	28	SO28	40	–
74ACT11472N	N	28	PLDIL	40	–
74ACT11473D	D	28	SO28	40	–
74ACT11473N	N	28	PLDIL	40	–
74ACT11474D	D	28	SO28	40	–
74ACT11474N	N	28	PLDIL	40	–
74ACT11475D	D	28	SO28	40	–
74ACT11475N	N	28	PLDIL	40	–
74ACT11520D	D	20	SO20	35	–
74ACT11520N	N	20	PLDIL	35	–
74ACT11521D	D	20	SO20	35	–

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74ACT11521N	N	20	PLDIL	35	–
74ACT11533D	D	24	SO24	37;39	–
74ACT11533N	N	24	PLDIL	37;39	–
74ACT11534D	D	24	SO24	37	–
74ACT11534N	N	24	PLDIL	37	–
74ACT11543D	D	28	SO28	40	–
74ACT11543N	N	28	PLDIL	40	–
74ACT11544D	D	28	SO28	40	–
74ACT11544N	N	28	PLDIL	40	–
74ACT11568D	D	24	SO24	36	–
74ACT11568N	N	24	PLDIL	36	–
74ACT11569D	D	24	SO24	36	–
74ACT11569N	N	24	PLDIL	36	–
74ACT11579D	D	24	SO20	36	–
74ACT11579N	N	24	PLDIL	36	–
74ACT11590D	D	20	SO20	36	–
74ACT11590N	N	20	PLDIL	36	–
74ACT11592D	D	16	SO16	36	–
74ACT11592N	N	16	PLDIL	36	–
74ACT11593D	D	24	SO24	36	–
74ACT11593N	N	24	PLDIL	36	–
74ACT11620D	D	24	SO24	40	–
74ACT11620N	N	24	PLDIL	40	–
74ACT11623D	D	24	SO24	40	–
74ACT11623N	N	24	PLDIL	40	–
74ACT11640D	D	24	SO24	40	–
74ACT11640N	N	24	PLDIL	40	–
74ACT11643D	D	24	SO24	40	–
74ACT11643N	N	24	PLDIL	40	–
74ACT11646D	D	28	SO28	40	–
74ACT11646N	N	28	PLDIL	40	–
74ACT11648D	D	28	SO28	40	–
74ACT11648N	N	28	PLDIL	40	–
74ACT11651D	D	28	SO28	40	–
74ACT11651N	N	28	PLDIL	40	–
74ACT11652D	D	28	SO28	40	–
74ACT11652N	N	28	PLDIL	40	–
74ACT11655D	D	28	SO28	35;36	–
74ACT11655N	N	28	PLDIL	35;36	–
74ACT11656D	D	28	SO28	35;36	–
74ACT11656N	N	28	PLDIL	35;36	–
74ACT11657D	D	28	SO28	40	–
74ACT11657N	N	28	PLDIL	40	–
74ACT11677D	D	24	SO24	35	–
74ACT11677N	N	24	PLDIL	35	–
74ACT11678D	D	24	SO24	35	–
74ACT11678N	N	24	PLDIL	35	–
74ACT11800D	D	24	SO24	38	–
74ACT11800N	N	24	PLDIL	38	–
74ACT11802D	D	24	SO24	38	–
74ACT11802N	N	24	PLDIL	38	–
74ACT11810D	D	16	SO16	38	–
74ACT11810N	N	16	PLDIL	38	–
74ACT11818D	D	28	SO28	39	–
74ACT11818N	N	28	PLDIL	39	–
74ACT11819D	D	28	SO28	39	–
74ACT11819N	N	28	PLDIL	39	–

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74ACT11821D	D	28	SO28	37	–
74ACT11821N	N	28	PLDIL	37	–
74ACT11822D	D	28	SO28	37	–
74ACT11822N	N	28	PLDIL	37	–
74ACT11823D	D	28	SO28	37	–
74ACT11823N	N	28	PLDIL	37	–
74ACT11824D	D	28	SO28	37	–
74ACT11824N	N	28	PLDIL	37	–
74ACT11825D	D	28	SO28	37	–
74ACT11825N	N	28	PLDIL	37	–
74ACT11826D	D	28	SO28	37	–
74ACT11826N	N	28	PLDIL	37	–
74ACT11827D	D	28	SO28	35;36	–
74ACT11827N	N	28	PLDIL	35;36	–
74ACT11828D	D	28	SO28	35;36	–
74ACT11828N	N	28	PLDIL	35;36	–
74ACT11833D	D	28	SO28	40	–
74ACT11833N	N	28	PLDIL	40	–
74ACT11834D	D	28	SO28	40	–
74ACT11834N	N	28	PLDIL	40	–
74ACT11841D	D	28	SO28	37;39	–
74ACT11841N	N	28	PLDIL	37;39	–
74ACT11842D	D	28	SO28	37;39	–
74ACT11842N	N	28	PLDIL	37;39	–
74ACT11843D	D	28	SO28	37;39	–
74ACT11843N	N	28	PLDIL	37;39	–
74ACT11844D	D	28	SO28	37;39	–
74ACT11844N	N	28	PLDIL	37;39	–
74ACT11845D	D	28	SO28	37;39	–
74ACT11845N	N	28	PLDIL	37;39	–
74ACT11846D	D	28	SO28	37;39	–
74ACT11846N	N	28	PLDIL	37;39	–
74ACT11852D	D	28	SO28	40	–
74ACT11852N	N	28	PLDIL	40	–
74ACT11853D	D	28	SO28	40	–
74ACT11853N	N	28	PLDIL	40	–
74ACT11854D	D	28	SO28	40	–
74ACT11854N	N	28	PLDIL	40	–
74ACT11856D	D	28	SO28	40	–
74ACT11856N	N	28	PLDIL	40	–
74ACT11858D	D	28	SO28	39	–
74ACT11858N	N	28	PLDIL	39	–
74ACT11859D	D	28	SO28	39	–
74ACT11859N	N	28	PLDIL	39	–
74ACT11860D	D	24	SO24	35	–
74ACT11860N	N	24	PLDIL	35	–
74ACT11861D	D	28	SO28	40	–
74ACT11861N	N	28	PLDIL	40	–
74ACT11862D	D	28	SO28	41	–
74ACT11862N	N	28	PLDIL	41	–
74ACT11863D	D	28	SO28	41	–
74ACT11863N	N	28	PLDIL	41	–
74ACT11864D	D	28	SO28	41	–
74ACT11864N	N	28	PLDIL	41	–
74ACT11865D	D	16	SO16	35	–
74ACT11865N	N	16	PLDIL	35	–
74ACT11867D	D	28	SO28	36	–

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74ACT11867N	N	28	PLDIL	36	–
74ACT11869D	D	28	SO28	36	–
74ACT11869N	N	28	PLDIL	36	–
74ACT11870D	D	28	SO28	39	–
74ACT11870N	N	28	PLDIL	39	–
74ACT11873D	D	28	SO28	37;39	–
74ACT11873N	N	28	PLDIL	37;39	–
74ACT11874D	D	28	SO28	37	–
74ACT11874N	N	28	PLDIL	37	–
74ACT11877D	D	28	SO28	41	–
74ACT11877N	N	28	PLDIL	41	–
74ACT11881D	D	28	SO28	35	–
74ACT11881N	N	28	PLDIL	35	–
74ACT11882D	D	28	SO28	35	–
74ACT11882N	N	28	PLDIL	35	–
74ACT11885D	D	24	SO24	35	–
74ACT11885N	N	24	PLDIL	35	–
74ACT11898D	D	20	SO20	39	–
74ACT11898N	N	20	PLDIL	39	–
74ACT11979D	D	16	SO16	39	–
74ACT11979N	N	16	PLDIL	39	–
74ACT11980D	D	20	SO20	39	–
74ACT11980N	N	20	PLDIL	39	–
74ACT11981D	D	20	SO20	39	–
74ACT11981N	N	20	PLDIL	39	–
74ACT11987D	D	20	SO20	40	–
74ACT11987N	N	20	PLDIL	40	–
74ACT11988D	D	20	SO20	40	–
74ACT11988N	N	20	PLDIL	40	–
74AC11000D	D	16	SO16	38	IC07
74AC11000N	N	16	PLDIL	38	IC07
74AC11002D	D	16	SO16	38	IC07
74AC11002N	N	16	PLDIL	38	IC07
74AC11004D	D	20	SO20	39	IC07
74AC11004N	N	20	PLDIL	39	IC07
74AC11008D	D	16	SO16	38	IC07
74AC11008N	N	16	PLDIL	38	IC07
74AC11010D	D	16	SO16	38	IC07
74AC11010N	N	16	PLDIL	38	IC07
74AC11011D	D	16	SO16	38	IC07
74AC11011N	N	16	PLDIL	38	IC07
74AC11013D	D	14	SO14	38;40	–
74AC11013N	N	14	PLDIL	38;40	–
74AC11014D	D	20	SO20	38;40	–
74AC11014N	N	20	PLDIL	38;40	–
74AC11020D	D	14	SO14	38	IC07
74AC11020N	N	14	PLDIL	38	IC07
74AC11021D	D	14	SO14	38	IC07
74AC11021N	N	14	PLDIL	38	IC07
74AC11027D	D	16	SO16	38	IC07
74AC11027N	N	16	PLDIL	38	IC07
74AC11030D	D	14	SO14	38	IC07
74AC11030N	N	14	PLDIL	38	IC07
74AC11032D	D	16	SO16	38	IC07
74AC11032N	N	16	PLDIL	38	IC07
74AC11034D	D	20	SO20	39	–
74AC11034N	N	20	PLDIL	39	–

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74AC11051D	D	14	SO14	38	–
74AC11051N	N	14	PLDIL	38	–
74AC11064D	D	14	SO14	38	–
74AC11064N	N	14	PLDIL	38	–
74AC11074D	D	14	SO14	37	IC07
74AC11074N	N	14	PLDIL	37	IC07
74AC11086D	D	16	SO16	38	–
74AC11086N	N	16	PLDIL	38	–
74AC11109D	D	16	SO16	37	IC07
74AC11109N	N	16	PLDIL	37	IC07
74AC11112D	D	16	SO16	37	–
74AC11112N	N	16	PLDIL	37	–
74AC11132D	D	16	SO16	40	–
74AC11132N	N	16	PLDIL	40	–
74AC11138D	D	16	SO16	36	IC07
74AC11138N	N	16	PLDIL	36	IC07
74AC11139D	D	16	SO16	36	–
74AC11139N	N	16	PLDIL	36	–
74AC11150D	D	24	SO24	39	–
74AC11150N	N	24	PLDIL	39	–
74AC11151D	D	16	SO16	39	–
74AC11151N	N	16	PLDIL	39	–
74AC11153D	D	16	SO16	39	–
74AC11153N	N	16	PLDIL	39	–
74AC11154D	D	24	SO24	36	–
74AC11154N	N	24	PLDIL	36	–
74AC11157D	D	20	SO20	39	–
74AC11157N	N	20	PLDIL	39	–
74AC11158D	D	20	SO20	39	IC07
74AC11158N	N	20	PLDIL	39	IC07
74AC11160D	D	20	SO20	35	IC07
74AC11160N	N	20	PLDIL	35	IC07
74AC11161D	D	20	SO20	35	–
74AC11161N	N	20	PLDIL	35	–
74AC11162D	D	20	SO20	35	IC07
74AC11162N	N	20	PLDIL	35	IC07
74AC11163D	D	20	SO20	35	–
74AC11163N	N	20	PLDIL	35	–
74AC11168D	D	20	SO20	35	–
74AC11168N	N	20	PLDIL	35	–
74AC11169D	D	20	SO20	35	–
74AC11169N	N	20	PLDIL	35	–
74AC11174D	D	20	SO20	37	–
74AC11174N	N	20	PLDIL	37	–
74AC11175D	D	20	SO20	37	–
74AC11175N	N	20	PLDIL	37	–
74AC11181D	D	28	SO28	35	–
74AC11181N	N	28	PLDIL	35	–
74AC11190D	D	20	SO20	35	–
74AC11190N	N	20	PLDIL	35	–
74AC11191D	D	20	SO20	35	–
74AC11191N	N	20	PLDIL	35	–
74AC11192D	D	20	SO20	35	–
74AC11192N	N	20	PLDIL	35	–
74AC11193D	D	20	SO20	35	–
74AC11193N	N	20	PLDIL	35	–
74AC11194D	D	20	SO20	39	–

extended type no.	package code	no. of pins	pin position	catalogue page no.	handbook
74AC11194N	N	20	PLDIL	39	–
74AC11208D	D	20	SO20	36	–
74AC11208N	N	20	PLDIL	36	–
74AC11238D	D	16	SO16	36	IC07
74AC11238N	N	16	PLDIL	36	IC07
74AC11239D	D	16	SO16	36	–
74AC11239N	N	16	PLDIL	36	–
74AC11240D	D	24	SO24	35;36	IC07
74AC11240N	N	24	PLDIL	35;36	IC07
74AC11241D	D	24	SO24	35;36	IC07
74AC11241N	N	24	PLDIL	35;36	IC07
74AC11244D	D	24	SO24	35;36	IC07
74AC11244N	N	24	PLDIL	35;36	IC07
74AC11245D	D	24	SO24	40	IC07
74AC11245N	N	24	PLDIL	40	IC07
74AC11250D	D	24	SO24	39	–
74AC11250N	N	24	PLDIL	39	–
74AC11251D	D	16	SO16	39	–
74AC11251N	N	16	PLDIL	39	–
74AC11253D	D	16	SO16	39	IC07
74AC11253N	N	16	PLDIL	39	IC07
74AC11257D	D	20	SO20	39	–
74AC11257N	N	20	PLDIL	39	–
74AC11258D	D	20	SO20	39	–
74AC11258N	N	20	PLDIL	39	–
74AC11269D	D	28	SO28	36	–
74AC11269N	N	28	PLDIL	36	–
74AC11273D	D	24	SO24	37	–
74AC11273N	N	24	PLDIL	37	–
74AC11280D	D	14	SO14	35	–
74AC11280N	N	14	PLDIL	35	–
74AC11286D	D	14	SO14	35	–
74AC11286N	N	14	PLDIL	35	–
74AC11299D	D	24	SO24	39	–
74AC11299N	N	24	PLDIL	39	–
74AC11323D	D	24	SO24	39	–
74AC11323N	N	24	PLDIL	39	–
74AC11352D	D	16	SO16	39	–
74AC11352N	N	16	PLDIL	39	–
74AC11353D	D	16	SO16	39	IC07
74AC11353N	N	16	PLDIL	39	IC07
74AC11373D	D	24	SO24	37;39	IC07
74AC11373N	N	24	PLDIL	37;39	IC07
74AC11374D	D	24	SO24	37	IC07
74AC11374N	N	24	PLDIL	37	IC07
74AC11377D	D	24	SO24	37	–
74AC11377N	N	24	PLDIL	37	–
74AC11378D	D	20	SO20	37	–
74AC11378N	N	20	PLDIL	37	–
74AC11379D	D	20	SO20	37	–
74AC11379N	N	20	PLDIL	37	–
74AC11461D	D	28	SO28	36	–
74AC11461N	N	28	PLDIL	36	–
74AC11463D	D	28	SO28	36	–
74AC11463N	N	28	PLDIL	36	–
74AC11469D	D	28	SO28	36	–
74AC11469N	N	28	PLDIL	36	–

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74AC11470D	D	28	SO28	40	–
74AC11470N	N	28	PLDIL	40	–
74AC11471D	D	28	SO28	40	–
74AC11471N	N	28	PLDIL	40	–
74AC11472D	D	28	SO28	40	–
74AC11472N	N	28	PLDIL	40	–
74AC11473D	D	28	SO28	40	–
74AC11473N	N	28	PLDIL	40	–
74AC11474D	D	28	SO28	40	–
74AC11474N	N	28	PLDIL	40	–
74AC11475D	D	28	SO28	40	–
74AC11475N	N	28	PLDIL	40	–
74AC11520D	D	20	SO20	35	–
74AC11520N	N	20	PLDIL	35	–
74AC11521D	D	20	SO20	35	–
74AC11521N	N	20	PLDIL	35	–
74AC11533D	D	24	SO24	37;39	–
74AC11533N	N	24	PLDIL	37;39	–
74AC11534D	D	24	SO24	37	–
74AC11534N	N	24	PLDIL	37	–
74AC11543D	D	28	SO28	40	–
74AC11543N	N	28	PLDIL	40	–
74AC11544D	D	28	SO28	40	–
74AC11544N	N	28	PLDIL	40	–
74AC11568D	D	24	SO24	36	–
74AC11568N	N	24	PLDIL	36	–
74AC11569D	D	24	SO24	36	–
74AC11569N	N	24	PLDIL	36	–
74AC11579D	D	24	SO20	36	–
74AC11579N	N	24	PLDIL	36	–
74AC11590D	D	20	SO20	36	–
74AC11590N	N	20	PLDIL	36	–
74AC11592D	D	16	SO16	36	–
74AC11592N	N	16	PLDIL	36	–
74AC11593D	D	24	SO24	36	–
74AC11593N	N	24	PLDIL	36	–
74AC11620D	D	24	SO24	40	–
74AC11620N	N	24	PLDIL	40	–
74AC11623D	D	24	SO24	40	–
74AC11623N	N	24	PLDIL	40	–
74AC11640D	D	24	SO24	40	–
74AC11640N	N	24	PLDIL	40	–
74AC11643D	D	24	SO24	40	–
74AC11643N	N	24	PLDIL	40	–
74AC11646D	D	28	SO28	40	–
74AC11646N	N	28	PLDIL	40	–
74AC11648D	D	28	SO28	40	–
74AC11648N	N	28	PLDIL	40	–
74AC11651D	D	28	SO28	40	–
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74AC11652D	D	28	SO28	40	–
74AC11652N	N	28	PLDIL	40	–
74AC11655D	D	28	SO28	35;36	–
74AC11655N	N	28	PLDIL	35;36	–
74AC11656D	D	28	SO28	35;36	–
74AC11656N	N	28	PLDIL	35;36	–
74AC11657D	D	28	SO28	40	–

extended type no.	package code	no. of pins	pin position	catalogue page no.	handbook
74AC11657N	N	28	PLDIL	40	–
74AC11677D	D	24	SO24	35	–
74AC11677N	N	24	PLDIL	35	–
74AC11678D	D	24	SO24	35	–
74AC11678N	N	24	PLDIL	35	–
74AC11800D	D	24	SO24	38	–
74AC11800N	N	24	PLDIL	38	–
74AC11802D	D	24	SO24	38	–
74AC11802N	N	24	PLDIL	38	–
74AC11810D	D	16	SO16	38	–
74AC11810N	N	16	PLDIL	38	–
74AC11818D	D	28	SO28	39	–
74AC11818N	N	28	PLDIL	39	–
74AC11819D	D	28	SO28	39	–
74AC11819N	N	28	PLDIL	39	–
74AC11821D	D	28	SO28	37	–
74AC11821N	N	28	PLDIL	37	–
74AC11822D	D	28	SO28	37	–
74AC11822N	N	28	PLDIL	37	–
74AC11823D	D	28	SO28	37	–
74AC11823N	N	28	PLDIL	37	–
74AC11824D	D	28	SO28	37	–
74AC11824N	N	28	PLDIL	37	–
74AC11825D	D	28	SO28	37	–
74AC11825N	N	28	PLDIL	37	–
74AC11826D	D	28	SO28	37	–
74AC11826N	N	28	PLDIL	37	–
74AC11827D	D	28	SO28	35;36	–
74AC11827N	N	28	PLDIL	35;36	–
74AC11828D	D	28	SO28	35;36	–
74AC11828N	N	28	PLDIL	35;36	–
74AC11833D	D	28	SO28	40	–
74AC11833N	N	28	PLDIL	40	–
74AC11834D	D	28	SO28	40	–
74AC11834N	N	28	PLDIL	40	–
74AC11841D	D	28	SO28	37;39	–
74AC11841N	N	28	PLDIL	37;39	–
74AC11842D	D	28	SO28	37;39	–
74AC11842N	N	28	PLDIL	37;39	–
74AC11843D	D	28	SO28	37;39	–
74AC11843N	N	28	PLDIL	37;39	–
74AC11844D	D	28	SO28	37;39	–
74AC11844N	N	28	PLDIL	37;39	–
74AC11845D	D	28	SO28	37;39	–
74AC11845N	N	28	PLDIL	37;39	–
74AC11846D	D	28	SO28	37;39	–
74AC11846N	N	28	PLDIL	37;39	–
74AC11852D	D	28	SO28	40	–
74AC11852N	N	28	PLDIL	40	–
74AC11853D	D	28	SO28	40	–
74AC11853N	N	28	PLDIL	40	–
74AC11854D	D	28	SO28	40	–
74AC11854N	N	28	PLDIL	40	–
74AC11856D	D	28	SO28	40	–
74AC11856N	N	28	PLDIL	40	–
74AC11858D	D	28	SO28	39	–
74AC11858N	N	28	PLDIL	39	–

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74AC11859D	D	28	SO28	39	–
74AC11859N	N	28	PLDIL	39	–
74AC11860D	D	24	SO24	35	–
74AC11860N	N	24	PLDIL	35	–
74AC11861D	D	28	SO28	40	–
74AC11861N	N	28	PLDIL	40	–
74AC11862D	D	28	SO28	41	–
74AC11862N	N	28	PLDIL	41	–
74AC11863D	D	28	SO28	41	–
74AC11863N	N	28	PLDIL	41	–
74AC11864D	D	28	SO28	41	–
74AC11864N	N	28	PLDIL	41	–
74AC11865D	D	16	SO16	35	–
74AC11865N	N	16	PLDIL	35	–
74AC11867D	D	28	SO28	36	–
74AC11867N	N	28	PLDIL	36	–
74AC11869D	D	28	SO28	36	IC07
74AC11869N	N	28	PLDIL	36	IC07
74AC11870D	D	28	SO28	39	–
74AC11870N	N	28	PLDIL	39	–
74AC11873D	D	28	SO28	37;39	–
74AC11873N	N	28	PLDIL	37;39	–
74AC11874D	D	28	SO28	37	–
74AC11874N	N	28	PLDIL	37	–
74AC11877D	D	28	SO28	41	–
74AC11877N	N	28	PLDIL	41	–
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74AC11881N	N	28	PLDIL	35	–
74AC11882D	D	28	SO28	35	–
74AC11882N	N	28	PLDIL	35	–
74AC11885D	D	24	SO24	35	–
74AC11885N	N	24	PLDIL	35	–
74AC11898D	D	20	SO20	39	–
74AC11898N	N	20	PLDIL	39	–
74AC11979D	D	16	SO16	39	–
74AC11979N	N	16	PLDIL	39	–
74AC11980D	D	20	SO20	39	–
74AC11980N	N	20	PLDIL	39	–
74AC11981D	D	20	SO20	39	–
74AC11981N	N	20	PLDIL	39	–
74AC11987D	D	20	SO20	40	–
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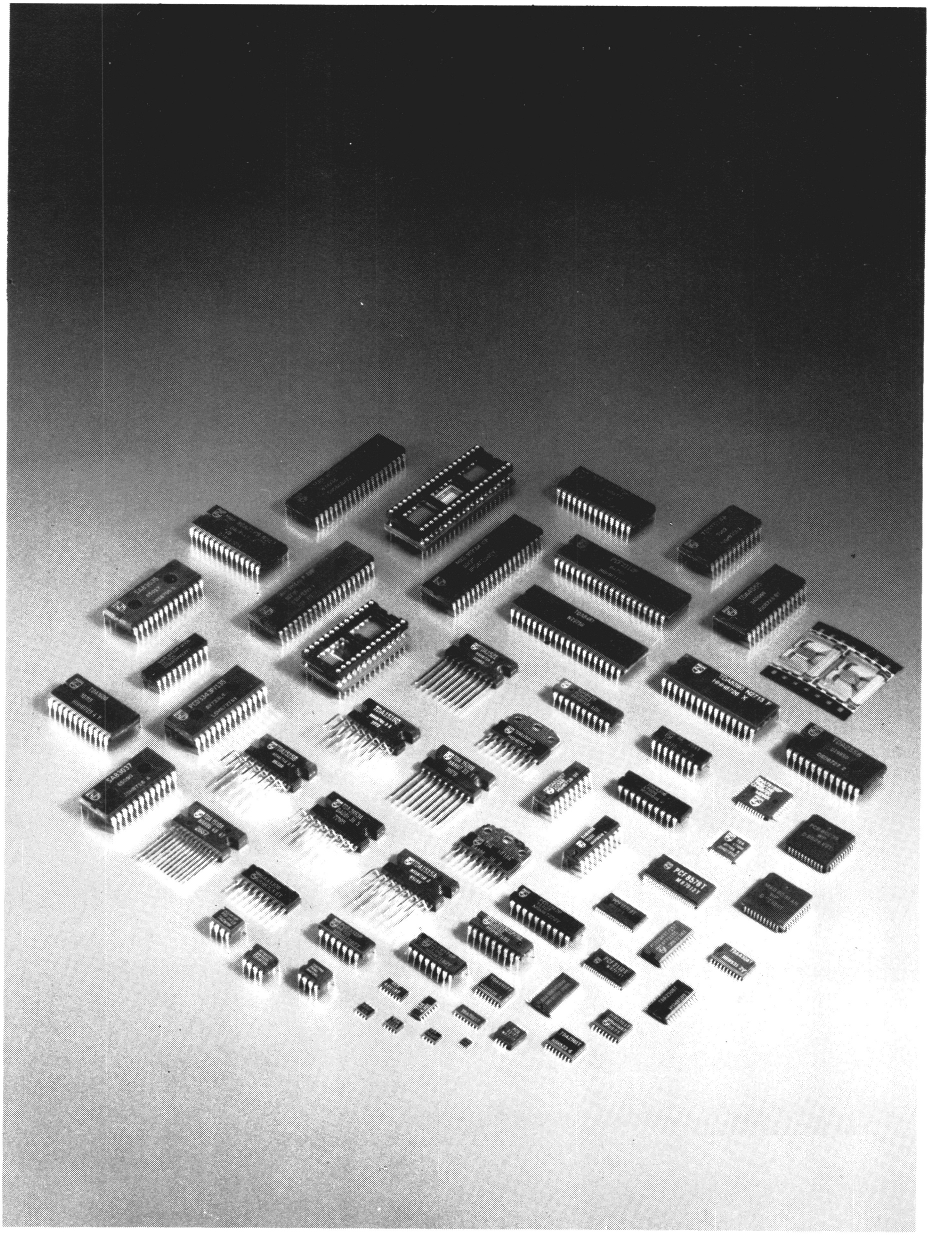

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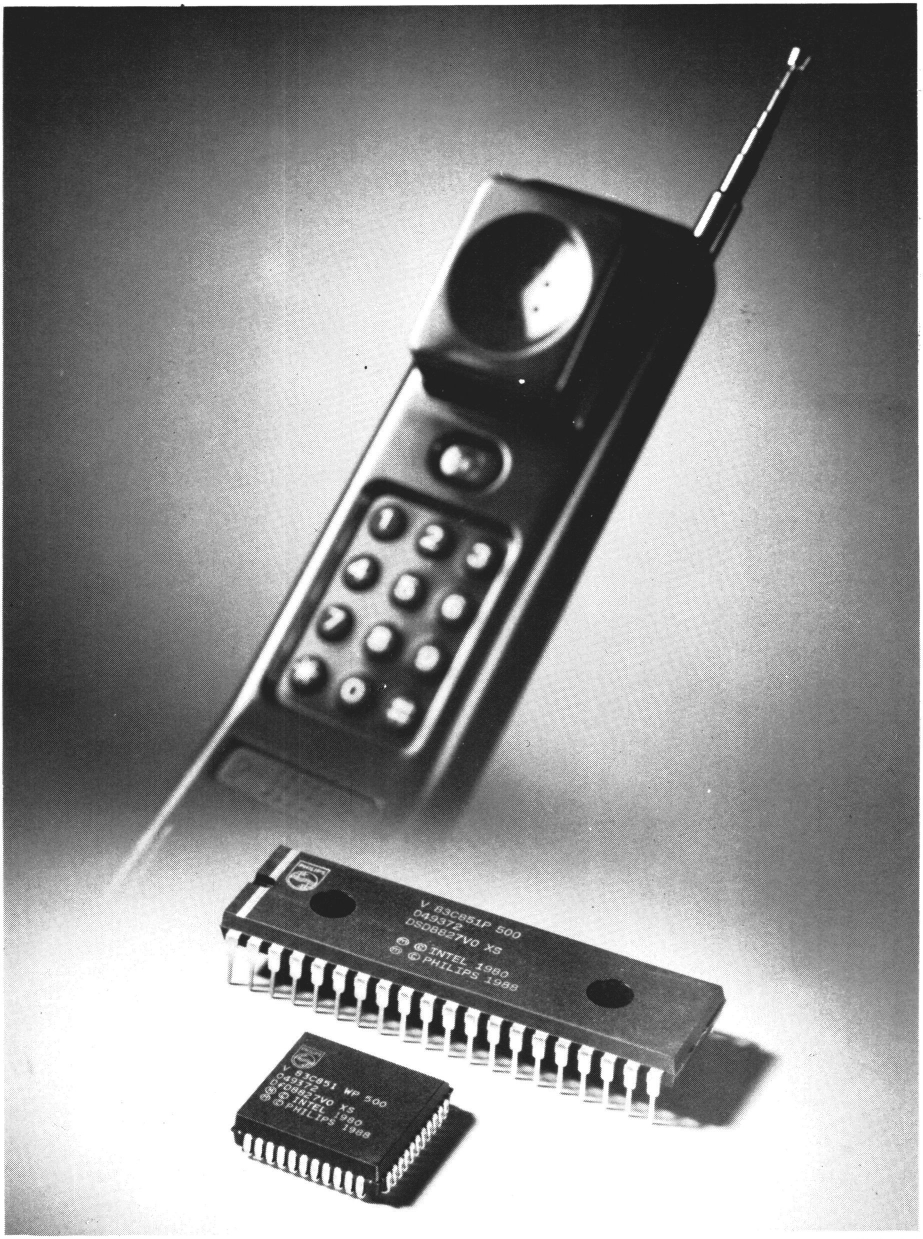
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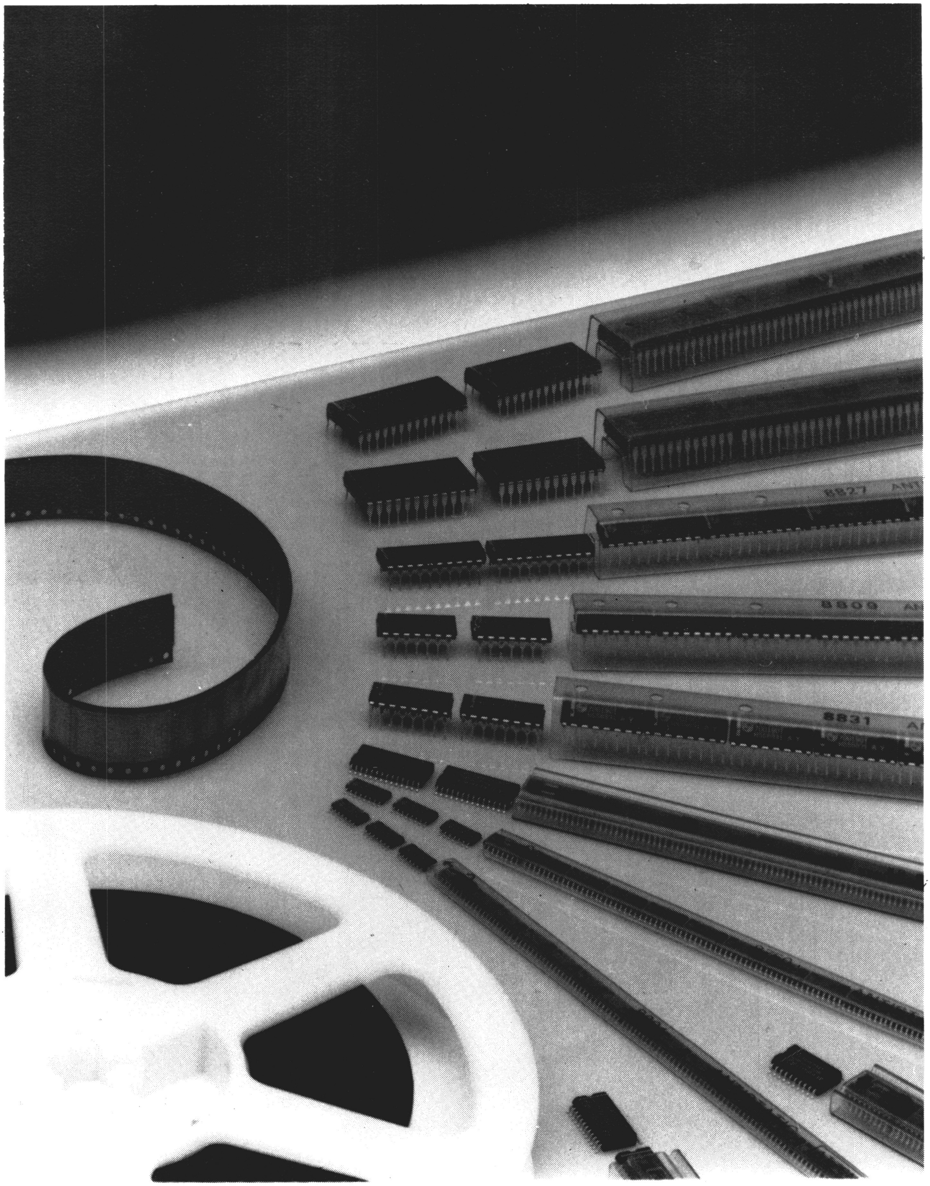
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Discrete semiconductors

S

Data Handbook System

On most pages, directly underneath the title, reference is made to a 'Data Handbook'.
That Handbook is part of the Philips Data Handbook System which is a comprehensive source of information on electronic components, subassemblies and materials.
For this catalogue section the following Handbooks are of interest:

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S1	Diodes Small–signal silicon diodes, voltage regulator diodes (< 1,5 W), voltage reference diodes, tuner diodes, rectifier diodes
S2a	Power diodes
S2b	Thyristors and triacs
S3	Small–signal transistors
S4a	Low–frequency power transistors and hybrid IC power modules
S4b	High–voltage and switching power transistors
S5	Small signal field–effect transistors
S6	RF power transistors and modules
S7	Surface mounted semiconductors
S8a	Light–emitting diodes
S8b	Devices for optoelectronics Optocouplers, photosensitive diodes and transistors, infrared light–emitting diodes and infrared sensitive devices, laser and fibre–optic components
S9	PowerMOS transistors
S10	Wideband transistors and wideband hybrid IC modules
S11	Microwave transistors
S13	Semiconductor sensors
S14	Liquid Crystal Displays and driver ICs for LCDs

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  - Fast general purpose and efficiency types S9
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Letter symbols

C_d	Diode capacitance
C_{rb}	Feedback capacitance (common base)
C_{rd}	Feedback capacitance (common drain)
C_{re}	Feedback capacitance (common emitter)
C_{rs}	Feedback capacitance (common source)
CMRR	Common mode rejection ratio
D^*	Detectivity
d_{im}	Intermodulation distortion
d_{cm}	Cross-modulation distortion
$E_{e\,tr}$	Irradiance to trigger a device
F	Noise figure
f	Frequency
$f_{h_{fe}}$	Frequency at which h_{fe} is -3 dB
f_T	Transition frequency
$\Delta\frac{1}{g_{fs}}$	Difference in transfer impedance
$\Delta\frac{g_{os}}{g_{fs}}$	Difference in penetration factor
G_p	Power gain
G_{UM}	Maximum unilateral power gain
h_{fe}	Small-signal current gain
h_{FE}	D.C. current gain
$\frac{\Delta I}{\Delta T}$	Equivalent differential current change with temperature
I_A	Anode current
dI_A/dT	Rate of rise of anode current
I_{ARM}	Repetitive peak anode current
I_B	D.C. (or average) base current
I_C	D.C. (or average) collector current
$I_{(CL)SM}$	Non-repetitive peak clamping current
I_{CM}	Peak value of I_C
I_D	Off-state current
I_{DSS}	Drain current (source short-circuited to gate)
I_{DSX}	Drain cut-off current (specified conditions)
I_e	Radiant intensity
I_F	Forward current (d.c. or average)
$I_{F(AV)}$	Total average forward current
I_{FM}	Peak forward current
I_{FRM}	Repetitive peak forward current
I_{FSM}	Non-repetitive peak forward current
I_{FWM}	Working peak forward current
I_{GSS}	Gate cut-off current (source short-circuited to drain)
I_{GT}	Gate-cathode current that will trigger all devices
I_H	Holding current
I_{ISM}	Non-repetitive peak input current
$I_{O(AV)}$	Average output current
I_{opt}	Output current at optimum operation
I_{ORM}	Repetitive peak output current
I_R	Reverse (cut-off) current
$I_{R(D)}$	Dark reverse current
I_{RRM}	Repetitive peak reverse current
I_{SDX}	Source cut-off current (specified conditions)
I_{SGO}	Source current (open drain)
I_T	On-state current
dI_T/dt	Rate of rise of on-state current
$I_{T(AV)}$	Average on-state current
I_{TRM}	Repetitive peak on-state current
$I_{T(RMS)}$	R.M.S. value of the on-state current
I_{TSM}	Non-repetitive peak on-state current
I_{TWM}	Working peak on-state current
I_v	Luminous intensity
I_Z	Working current (d.c. or average)
I_{ZM}	Peak working current
I_{ZRM}	Repetitive peak working current
I^2t	I squared t for fusing
N	Light sensitivity
P_D	Drive power
P.E.P.	Peak envelope power
P_L	Load power
P_o	Output power
P_{opt}	Optimum output power
P_{RRM}	Repetitive peak reverse power dissipation
P_{RSM}	Non-repetitive peak reverse power dissipation

P_S	Source power
P_{tot}	Total power dissipation
P_{ZRM}	Repetitive peak reverse power dissipation
P_{ZSM}	Non-repetitive peak reverse power dissipation
r_D	Diode series resistance
r_{diff}	Differential resistance
r_{do}	Initial dark resistance
r_{DSoff}	Drain-source resistance (off)
$r_{ds\,on}$	Drain-source resistance (on) at specified frequency
R_L	Load resistance
r_{lo}	Initial illumination resistance
S_F, S_Z	Temperature coefficient of the working voltage
T_{amb}	Ambient temperature
T_c	Colour temperature
t_d	Forward conduction delay
t_f	Fall time
T_h	Heatsink temperature
T_j	Junction temperature
T_{mb}	Mounting base temperature
t_{off}	Turn-off time
t_{on}	Turn-on time
t_q	Circuit commutated turn-off time
t_r	Rise time
t_{rr}	Reverse recovery time
t_{tot}	Total recovery time
V_{AK}	Anode-cathode voltage
V_B	Supply voltage
V_{CBO}	Collector-base voltage (open emitter)
V_{CEO}	Collector-emitter voltage (open base)
V_{CER}	Collector-emitter voltage with a specified resistance between emitter and base
V_{CERM}	Peak value of V_{CER}
V_{CES}	Collector-emitter voltage (emitter to base)
V_{CESM}	Peak value of V_{CES}
V_{CEsat}	Collector-emitter saturation voltage
$V_{(CL)R}$	Output clamping voltage
dV_{com}/dt	Rate of rise of commutating voltage that will not trigger any device
V_D	Continuous off-state voltage
dV_D/dt	Rate of rise of off-state voltage
V_{DB}	Drain-substrate voltage
V_{DRM}	Repetitive peak off-state voltage
V_{DS}	Drain-source voltage
V_{DWM}	Crest working off-state voltage
V_F	Continuous forward voltage
V_{GA}	Anode gate-anode voltage
V_{GK}	Cathode gate-cathode voltage
ΔV_{GS}	Gate-source voltage difference
$\frac{d\Delta V_{GS}}{dT}$	Thermal drift of gate-source voltage difference
V_{GT}	Gate-cathode voltage that will trigger all devices
V_I	Input stand-off voltage (transient suppressors)
V_{IRM}	Repetitive peak input voltage
$V_{I(RMS)}$	R.M.S. value of the input voltage
V_{IWM}	Crest working input voltage
V_n	Equivalent noise voltage
V_O	Output voltage
$V_{(opt)}$	Output voltage at optimum operation
$V_{(P)GS}$	Gate-source cut-off voltage
V_R	Continuous reverse voltage; stand-off voltage
V_{RRM}	Repetitive peak reverse voltage
V_{RWM}	Crest working reverse voltage
V_{SB}	Source-substrate voltage
V_Z	Working voltage
$\frac{\Delta V}{\Delta T}$	Equivalent differential voltage change with temperature
y_{fs}	Transfer admittance (common source)
η	Efficiency
α 50%	Beamwidth between half-intensity directions
λ_{peak}	Wavelength at peak spectral response or emission
ϕ_e	Radiant output power

Alphanumeric type number index

In this alphanumeric list we present all semiconductors mentioned in this catalogue. The second column is the code for the kind of product and the part of the Data Handbook System in which full information is given. The third column gives the page on which data can be found.

Key to product code:

FET	Field–effect transistors
HIC	Hybrid integrated circuits
I	Infrared devices
LED	Light–emitting diodes
LCD	Liquid crystal displays
Mm	Surface–mounting devices
Mw	Microwave transistors
P	Low–frequency power transistors and modules
PDT	Photodiodes or transistors
Ph	Photoconductive devices
PhC	Photocouplers
PM	Power MOS transistors
R	Rectifier diodes
RFP	R.F. power transistors and modules
RT	Tripler
S	Sensor devices
Saw	Surface accoustic wave filters
SD	Small–signal diodes
Sm	Small–signal transistors
Sp	Low–frequency switching power transistors
St	Rectifier stacks
T	Tuner diodes
Th	Thyristors
ThM	Thyristor modules
Tri	Triacs
Vrf	voltage reference diodes
Vrg	Voltage regulator diodes
WBT	Wideband transistors and modules

type	handbook reference	prod. code	cat. page
BA220	S1	SD	S1/5
BA221	S1	SD	S1
BA223	S1	T	S4
BA281	S1	SD	S4
BA314	S1	Vrg	S5
BA315	S1	Vrg	S5
BA316	S1	SD	S1
BA317	S1	SD	S1
BA318	S1	SD	S1
BA423	S1	T	S4
BA480	S1	T	S4
BA481	S1	T	S4
BA482	S1	T	S4
BA483	S1	T	S4
BA484	S1	T	S4
BA682	S1/S7	T/Mm	S148
BA683	S1/S7	T/Mm	S148
BAS11	S1	SD	S1
BAS15	S1	SD	S1
BAS16	S1/S7	SD/Mm	S147
BAS17*	S1/S7	Vrg/Mm	S148
BAS19	S1/S7	SD/Mm	S147
BAS20	S1/S7	SD/Mm	S147
BAS21	S1/S7	SD/Mm	S147
BAS28	S1/S7	SD/Mm	S147
BAS29	S1/S7	SD/Mm	S147
BAS31	S1/S7	SD/Mm	S147
BAS32	S1/S7	SD/Mm	S147
BAS35	S1/S7	SD/Mm	S147
BAS45	S1	SD	S2
BAS56	S1/S7	SD/Mm	S147
BAS85	S1/S7	SD/Mm	S147
BAT18	S1/S7	T/Mm	S148
BAT54	S1/S7	SD/Mm	S148
BAT74	S1/S7	SD/Mm	S148
BAT81	S1	T	S2
BAT82	S1	T	S2
BAT83	S1	T	S2
BAT85	S1	T	S2
BAT86	S1	T	S2
BAV10	S1	SD	S1
BAV18	S1	SD	S1
BAV19	S1	SD	S1
BAV20	S1	SD	S1
BAV21	S1	SD	S1
BAV23	S1/S7	SD/Mm	S146
BAV70	S1/S7	SD/Mm	S147
BAV99	S1/S7	SD/Mm	S147
BAV100	S1/S7	SD/Mm	S147
BAV101	S1/S7	SD/Mm	S147
BAV102	S1/S7	SD/Mm	S147
BAV103	S1/S7	SD/Mm	S147
BAV105	S1/S7	SD	S147
BAW56	S1/S7	SD/Mm	S147
BAW62	S1	SD	S1
BAX12	S1	SD	S1
BAX14	S1	SD	S1/5
BAX18	S1	SD	S1
BB112	S1	T	S3
BB119	S1	T	S3

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type	handbook reference	prod. code	cat. page
BB130	S1	T	S3
BB204B	S1	T	S3
BB212	S1	T	S3
BB215	S1/S7	SD/Mm	S147
BB219	S1/S7	SD/Mm	S147
BB405B	S1	T	S3
BB417	S1	T	S3
BB809	S1	T	S3
BB909A	S1	T	S3
BB909B	S1	T	S3
BBY31	S1/S7	T/Mm	S147
BBY39	S1/S7	T/Mm	S147
BBY40	S1/S7	T/Mm	S147
BBY42	S1/S7	T/Mm	S147
BC107	S3	Sm	S31
BC108	S3	Sm	S31
BC109	S3	Sm	S31
BC140	S3	Sm	S31
BC141	S3	Sm	S31
BC160	S3	Sm	S31
BC161	S3	Sm	S31
BC177	S3	Sm	S31
BC178	S3	Sm	S31
BC179	S3	Sm	S31
BC264A	S5	FET	S100
BC264B	S5	FET	S100
BC264C	S5	FET	S100
BC264D	S5	FET	S100
BC327;A	S3	Sm	S31
BC328	S3	Sm	S31
BC337;A	S3	Sm	S31
BC338	S3	Sm	S31
BC368	S3	Sm	S31
BC369	S3	Sm	S31
BC375	S3	Sm	S31
BC376	S3	Sm	S31
BC516	S3	Sm	S31/36
BC517	S3	Sm	S31/36
BC546	S3	Sm	S31
BC547	S3	Sm	S31
BC548	S3	Sm	S31
BC549	S3	Sm	S31
BC550	S3	Sm	S31
BC556	S3	Sm	S31
BC557	S3	Sm	S31
BC558	S3	Sm	S31
BC559	S3	Sm	S31
BC560	S3	Sm	S31
BC635	S3	Sm	S31
BC636	S3	Sm	S32
BC637	S3	Sm	S31
BC638	S3	Sm	S32
BC639	S3	Sm	S31
BC640	S3	Sm	S32
BC807	S7	Mm	S141
BC808	S7	Mm	S141
BC817	S7	Mm	S142
BC818	S7	Mm	S142
BC846	S7	Mm	S142
BC847	S7	Mm	S142
BC848	S7	Mm	S142
BC849	S7	Mm	S145
BC850	S7	Mm	S145
BC856	S7	Mm	S141
BC857	S7	Mm	S141
BC858	S7	Mm	S141
BC859	S7	Mm	S145
BC860	S7	Mm	S145
BC868	S7	Mm	S142
BC869	S7	Mm	S141
BCF29	S7	Mm	S145
BCF30	S7	Mm	S145
BCF32	S7	Mm	S145
BCF33	S7	Mm	S145
BCF70	S7	Mm	S145
BCF81	S7	Mm	S145
BCV26	S7	Mm	S141
BCV27	S7	Mm	S142
BCV61	S7	Mm	S142
BCV62	S7	Mm	S141
BCV63	S7	Mm	S141
BCV64	S7	Mm	S141
BCV65	S7	Mm	S141
BCV71	S7	Mm	S142
BCV72	S7	Mm	S142
BCW29	S7	Mm	S141
BCW30	S7	Mm	S141
BCW31	S7	Mm	S142
BCW32	S7	Mm	S142
BCW33	S7	Mm	S142

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BCW60*	S7	Mm	S142
BCW61*	S7	Mm	S141
BCW69	S7	Mm	S141
BCW70	S7	Mm	S141
BCW71	S7	Mm	S142
BCW72	S7	Mm	S142
BCW81	S7	Mm	S142
BCW89	S7	Mm	S141
BCX17	S7	Mm	S141
BCX18	S7	Mm	S141
BCX19	S7	Mm	S142
BCX20	S7	Mm	S142
BCX51	S7	Mm	S141
BCX52	S7	Mm	S141
BCX53	S7	Mm	S141
BCX54	S7	Mm	S142
BCX55	S7	Mm	S142
BCX56	S7	Mm	S142
BCX58	S3	Sm	S36
BCX59	S3	Sm	S36
BCX70*	S7	Mm	S142
BCX71*	S7	Mm	S141
BCX78	S3	Sm	S36
BCX79	S3	Sm	S36
BCY56	S3	Sm	S32
BCY57	S3	Sm	S32/36
BCY58*	S3	Sm	S32/36
BCY59*	S3	Sm	S32
BCY65	S3	Sm	S36
BCY70	S3	Sm	S32/36
BCY71	S3	Sm	S32/36
BCY72	S3	Sm	S32/36
BCY78*	S3	Sm	S32/36
BCY79	S3	Sm	S32/36
BCY87	S3	Sm	S32
BCY88	S3	Sm	S32
BCY89	S3	Sm	S32
BD131	S4a	P	S52
BD132	S4a	P	S52
BD135	S4a	P	S51
BD136	S4a	P	S51
BD137	S4a	P	S51
BD138	S4a	P	S51
BD139	S4a	P	S51
BD140	S4a	P	S51

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BD201	S4a	P	S53
BD202	S4a	P	S53
BD203	S4a	P	S53
BD204	S4a	P	S53
BD226	S4a	P	S51
BD227	S4a	P	S51
BD228	S4a	P	S51
BD229	S4a	P	S51
BD230	S4a	P	S51
BD231	S4a	P	S51
BD233	S4a	P	S51
BD234	S4a	P	S51
BD235	S4a	P	S51
BD236	S4a	P	S51
BD237	S4a	P	S51
BD238	S4a	P	S51
BD239	S4a	P	S52
BD239A	S4a	P	S52
BD239B	S4a	P	S52
BD239C	S4a	P	S52
BD240	S4a	P	S52
BD240A	S4a	P	S52
BD240B	S4a	P	S52
BD240C	S4a	P	S52
BD241	S4a	P	S52
BD241A	S4a	P	S52
BD241B	S4a	P	S52
BD241C	S4a	P	S52
BD242	S4a	P	S52
BD242A	S4a	P	S52
BD242B	S4a	P	S52
BD242C	S4a	P	S52
BD243	S4a	P	S53
BD243A	S4a	P	S53
BD243B	S4a	P	S53
BD243C	S4a	P	S53
BD244	S4a	P	S53
BD244A	S4a	P	S53
BD244B	S4a	P	S53
BD244C	S4a	P	S53
BD329	S4a	P	S52
BD330	S4a	P	S52
BD331;S	S4a	P	S49
BD332;S	S4a	P	S49
BD333;S	S4a	P	S49

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BD334;S	S4a	P	S49
BD335;S	S4a	P	S49
BD336;S	S4a	P	S49
BD337;S	S4a	P	S49
BD338;S	S4a	P	S49
BD433	S4a	P	S52
BD434	S4a	P	S52
BD435	S4a	P	S52
BD436	S4a	P	S52
BD437	S4a	P	S52
BD438	S4a	P	S52
BD643	S4a	P	S49
BD644	S4a	P	S49
BD645	S4a	P	S49
BD646	S4a	P	S49
BD647	S4a	P	S49
BD648	S4a	P	S49
BD649	S4a	P	S49
BD650	S4a	P	S49
BD651	S4a	P	S49
BD652	S4a	P	S49
BD675	S4a	P	S49
BD676	S4a	P	S49
BD677	S4a	P	S49
BD678	S4a	P	S49
BD679	S4a	P	S49
BD680	S4a	P	S49
BD681	S4a	P	S49
BD682	S4a	P	S49
BD683	S4a	P	S49
BD684	S4a	P	S49
BD719	S4a	P	S53
BD720	S4a	P	S53
BD721	S4a	P	S53
BD722	S4a	P	S53
BD723	S4a	P	S53
BD724	S4a	P	S53
BD725	S4a	P	S53
BD726	S4a	P	S53
BD825	S4a	P	S51
BD826	S4a	P	S51
BD827	S4a	P	S51
BD828	S4a	P	S51
BD829	S4a	P	S51
BD830	S4a	P	S51

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BD839	S4a	P	S51
BD840	S4a	P	S51
BD841	S4a	P	S51
BD842	S4a	P	S51
BD843	S4a	P	S51
BD844	S4a	P	S51
BD933	S4a	P	S52
BD934	S4a	P	S52
BD935	S4a	P	S52
BD936	S4a	P	S52
BD937	S4a	P	S52
BD938	S4a	P	S52
BD939	S4a	P	S52
BD940	S4a	P	S52
BD941	S4a	P	S52
BD942	S4a	P	S52
BD943	S4a	P	S52
BD944	S4a	P	S52
BD945	S4a	P	S52
BD946	S4a	P	S52
BD947	S4a	P	S52
BD948	S4a	P	S52
BD949	S4a	P	S52
BD950	S4a	P	S52
BD951	S4a	P	S52
BD952	S4a	P	S52
BD953	S4a	P	S52
BD954	S4a	P	S52
BD955	S4a	P	S52
BD956	S4a	P	S52
BDT29	S4a	P	S51
BDT29A	S4a	P	S51
BDT29B	S4a	P	S51
BDT29C	S4a	P	S51
BDT30	S4a	P	S51
BDT30A	S4a	P	S51
BDT30B	S4a	P	S51
BDT30C	S4a	P	S51
BDT31	S4a	P	S52
BDT31A	S4a	P	S52
BDT31B	S4a	P	S52
BDT31C	S4a	P	S52
BDT32	S4a	P	S52
BDT32A	S4a	P	S52
BDT32B	S4a	P	S52

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BDT32C	S4a	P	S52
BDT41	S4a	P	S52
BDT41A	S4a	P	S52
BDT41B	S4a	P	S52
BDT41C	S4a	P	S52
BDT42	S4a	P	S52
BDT42A	S4a	P	S52
BDT42B	S4a	P	S52
BDT42C	S4a	P	S52
BDT60	S4a	P	S49
BDT60A	S4a	P	S49
BDT60B	S4a	P	S49
BDT60C	S4a	P	S49
BDT61	S4a	P	S49
BDT61A	S4a	P	S49
BDT61B	S4a	P	S49
BDT61C	S4a	P	S49
BDT62	S4a	P	S49
BDT62A	S4a	P	S49
BDT62B	S4a	P	S49
BDT62C	S4a	P	S49
BDT63	S4a	P	S49
BDT63A	S4a	P	S49
BDT63B	S4a	P	S49
BDT63C	S4a	P	S49
BDT64	S4a	P	S50
BDT64A	S4a	P	S50
BDT64B	S4a	P	S50
BDT64C	S4a	P	S50
BDT65	S4a	P	S50
BDT65A	S4a	P	S50
BDT65B	S4a	P	S50
BDT65C	S4a	P	S50
BDT81	S4a	P	S53
BDT82	S4a	P	S53
BDT83	S4a	P	S53
BDT84	S4a	P	S53
BDT85	S4a	P	S53
BDT86	S4a	P	S53
BDT87	S4a	P	S53
BDT88	S4a	P	S53
BDT91	S4a	P	S53
BDT92	S4a	P	S53
BDT93	S4a	P	S53
BDT94	S4a	P	S53

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BDT95	S4a	P	S53
BDT96	S4a	P	S53
BDV64	S4a	P	S50
BDV64A	S4a	P	S50
BDV64B	S4a	P	S50
BDV64C	S4a	P	S50
BDV65	S4a	P	S50
BDV65A	S4a	P	S50
BDV65B	S4a	P	S50
BDV65C	S4a	P	S50
BDV66A	S4a	P	S50
BDV66B	S4a	P	S50
BDV66C	S4a	P	S50
BDV66D	S4a	P	S50
BDV67A	S4a	P	S50
BDV67B	S4a	P	S50
BDV67C	S4a	P	S50
BDV67D	S4a	P	S50
BDV91	S4a	P	S53
BDV92	S4a	P	S53
BDV93	S4a	P	S53
BDV94	S4a	P	S53
BDV95	S4a	P	S53
BDV96	S4a	P	S53
BDX35	S4a	P	S52
BDX36	S4a	P	S52
BDX37	S4a	P	S52
BDX42	S4a	P	S49
BDX43	S4a	P	S49
BDX44	S4a	P	S49
BDX45	S4a	P	S49
BDX46	S4a	P	S49
BDX47	S4a	P	S49
BDX62	S4a	P	S49
BDX62A	S4a	P	S49
BDX62B	S4a	P	S49
BDX62C	S4a	P	S49
BDX63	S4a	P	S49
BDX63A	S4a	P	S49
BDX63B	S4a	P	S49
BDX63C	S4a	P	S49
BDX64	S4a	P	S50
BDX64A	S4a	P	S50
BDX64B	S4a	P	S50
BDX64C	S4a	P	S50

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type	handbook reference	prod. code	cat. page
BDX65	S4a	P	S50
BDX65A	S4a	P	S50
BDX65B	S4a	P	S50
BDX65C	S4a	P	S50
BDX66	S4a	P	S50
BDX66A	S4a	P	S50
BDX66B	S4a	P	S50
BDX66C	S4a	P	S50
BDX67	S4a	P	S50
BDX67A	S4a	P	S50
BDX67B	S4a	P	S50
BDX67C	S4a	P	S50
BDX68	S4a	P	S50
BDX68A	S4a	P	S50
BDX68B	S4a	P	S50
BDX68C	S4a	P	S50
BDX69	S4a	P	S50
BDX69A	S4a	P	S50
BDX69B	S4a	P	S50
BDX69C	S4a	P	S50
BDX77	S4a	P	S53
BDX78	S4a	P	S53
BDX91	S4a	P	S53
BDX92	S4a	P	S53
BDX93	S4a	P	S53
BDX94	S4a	P	S53
BDX95	S4a	P	S53
BDX96	S4a	P	S53
BDY90	S4a	P	S53
BDY91	S4a	P	S53
BDY92	S4a	P	S53
BF198	S3	Sm	S34
BF199	S3	Sm	S34
BF240	S3	Sm	S34
BF241	S3	Sm	S34
BF245A	S5	FET	S100
BF245B	S5	FET	S100
BF245C	S5	FET	S100
BF247A	S5	FET	S100
BF247B	S5	FET	S100
BF247C	S5	FET	S100
BF256A	S5	FET	S100
BF256B	S5	FET	S100
BF256C	S5	FET	S100
BF324	S3	Sm	S34

type	handbook reference	prod. code	cat. page
BF370	S3	Sm	S34
BF410A	S5	FET	S100
BF410B	S5	FET	S100
BF410C	S5	FET	S100
BF410D	S5	FET	S100
BF419	S4b	SP	S54
BF420	S3	Sm	S34
BF421	S3	Sm	S34
BF422	S3	Sm	S34
BF423	S3	Sm	S34
BF450	S3	Sm	S34
BF451	S3	Sm	S34
BF457	S4b	SP	S54
BF458	S4b	SP	S54
BF459	S4b	SP	S54
BF469	S4b	SP	S54
BF470	S4b	SP	S54
BF471	S4b	SP	S54
BF472	S4b	SP	S54
BF483	S3	Sm	S34
BF485	S3	Sm	S34
BF487	S3	Sm	S34
BF494	S3	Sm	S34
BF495	S3	Sm	S34
BF496	S3	Sm	S34
BF510	S5/S7	FET/Mm	S100/146
BF511	S5/S7	FET/Mm	S100/146
BF512	S5/S7	FET/Mm	S100/146
BF513	S5/S7	FET/Mm	S100/146
BF550	S7	Mm	S143
BF569	S7	Mm	S143
BF570	S7	Mm	S143
BF579	S7	Mm	S143
BF583	S4b	SP	S54
BF585	S4b	SP	S54
BF587	S4b	SP	S54
BF620	S7	Mm	S145
BF621	S7	Mm	S145
BF622	S7	Mm	S145
BF623	S7	Mm	S145
BF660	S7	Mm	S143
BF689K	S10	WBT	S122
BF763	S7/S10	Mm/WBT	S122
BF767	S7	Mm	S143
BF819	S4b	SP	S54

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type	handbook reference	prod. code	cat. page
BF820	S7	Mm	S145
BF821	S7	Mm	S145
BF822	S7	Mm	S145
BF823	S7	Mm	S145
BF824	S7	Mm	S143
BF840	S7	Mm	S143
BF841	S7	Mm	S143
BF857	S4b	SP	S54
BF858	S4b	SP	S54
BF859	S4b	SP	S54
BF869	S4b	SP	S54
BF870	S4b	SP	S54
BF871	S4b	SP	S54
BF872	S4b	SP	S54
BF926	S3	Sm	S34
BF936	S3	Sm	S34
BF939	S3	Sm	S34
BF960	S5	FET	S102
BF964	S5	FET	S102
BF964S	S5	FET	S102
BF966	S5	FET	S102
BF966S	S5	FET	S102
BF967	S3	Sm	S34
BF970	S3	Sm	S35
BF970A	S3	Sm	S35
BF979	S3	Sm	S35
BF980	S5	FET	S102
BF981	S5	FET	S102
BF982	S5	FET	S102
BF989	S5/S7	FET/Mm	S102/146
BF990;A	S5/S7	FET/Mm	S102/146
BF991	S5/S7	FET/Mm	S102/146
BF992	S5/S7	FET/Mm	S102/146
BF994	S5	FET	S102
BF994S	S5/S7	FET/Mm	S102/146
BF996	S5	FET	S102
BF996S	S5/S7	FET/Mm	S146
BF997	S5/S7	FET/Mm	S146
BFG17A	S10	WBT	S122
BFG23	S10	WBT	S121/122
BFG32	S10	WBT	S121/122
BFG33	S10	WBT	S122
BFG34	S10	WBT	S121/122
BFG35	S7	WBT/Mm	S121/122
BFG51	S10	WBT	S121/122
BFG54	S10	WBT	S121/122
BFG65	S10	WBT	S121/122
BFG67	S10/S7	WBT/Mm	S121/143
BFG90A	S10	WBT	S121/122
BFG91A	S10	WBT	S121/122
BFG92A	S10	WBT	S121/122
BFG93A	S10	WBT	S121/122
BFG96	S10	WBT	S121/122
BFG97	S7	WBT/Mm	S121/122
BFG134	S10	WBT	S121/122
BFG135	S7	WBT/Mm	S121/122
BFG195	S10	WBT	S121/122
BFG197	S10	WBT	S122
BFG198	S7	WBT/Mm	S121/122
BFP24	S8b	PhC	S164
BFP31	S8b	PhC	S164
BFP90A	S10	WBT	S121/122
BFP91A	S10	WBT	S121/122
BFP96	S10	WBT	S121/122
BFQ12	S5	FET	S106
BFQ13	S5	FET	S106
BFQ14	S5	FET	S106
BFQ15	S5	FET	S106
BFQ16	S5	FET	S106
BFQ17	S10/S7	WBT/Mm	S122/143
BFQ18A	S10/S7	WBT/Mm	S121/143
BFQ19	S10/S7	WBT/Mm	S121/143
BFQ22S	S10	WBT	S121/122
BFQ23	S10	WBT	S121/122
BFQ23C	S10	WBT	S121/122
BFQ24	S10	WBT	S121/122
BFQ32	S10	WBT	S122
BFQ32C	S10	WBT	S121/122
BFQ32M	S10	WBT	S121/122
BFQ32S	S10	WBT	S121/122
BFQ33C	S10	WBT	S122
BFQ34	S10	WBT	S113/121
BFQ34T	S10	WBT	S121/122
BFQ42	S10	WBT	S109
BFQ43	S6	RFP	S109
BFQ43S	S6	RFP	S109
BFQ51	S10	WBT	S121/122
BFQ51C	S10	WBT	S121/122
BFQ52	S10	WBT	S121/122
BFQ53	S10	WBT	S121/122

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type	handbook reference	prod. code	cat. page
BFQ54	S10	WBT	S121/122
BFQ54T	S10	WBT	S121/122
BFQ63	S10	WBT	S121/122
BFQ65	S10	WBT	S121/122
BFQ66	S10	WBT	S122
BFQ67	S10/S7	WBT/Mm	S121/143
BFQ68	S10	WBT	S113/121
BFQ135	S10	WBT	S124
BFQ136	S10	WBT	S121/124
BFQ149	S10	WBT	S121/124
BFR29	S5	FET	S104
BFR30	S5/S7	FET/Mm	S100/146
BFR31	S5/S7	FET/Mm	S100/146
BFR53	S10/S7	WBT/Mm	S124/143
BFR54	S3	Sm	S35
BFR64	S10	WBT	S124
BFR65	S10	WBT	S124
BFR84	S5	FET	S102
BFR90	S10	WBT	S124
BFR90A	S10	WBT	S121/124
BFR91	S10	WBT	S124
BFR91A	S10	WBT	S121/124
BFR92	S10/S7	WBT/Mm	S124/143
BFR92A	S10/S7	WBT/Mm	S121/143
BFR93	S10/S7	WBT/Mm	S124/143
BFR93A	S10/S7	WBT/Mm	S121/143
BFR94	S10	WBT	S124
BFR95	S10	WBT	S124
BFR96	S10	WBT	S124
BFR96S	S10	WBT	S113/121
BFR101A;B	S5/S7	FET/Mm	S100/146
BFR106	S10	WBT	S121/124
BFR134	S10	WBT	S121/124
BFS17	S10/S7	WBT/Mm	S124/143
BFS17A	S10	WBT/Mm	S124/143
BFS18	S7	Mm	S143
BFS19	S7	Mm	S143
BFS20	S7	Mm	S143
BFS21	S5	FET	S106
BFS21A	S5	FET	S106
BFS22A	S6	RFP	S109
BFS23A	S6	RFP	S109
BFT24	S10	WBT	S122/124
BFT25	S10/S7	WBT/Mm	S121/143
BFT44	S3	Sm	S36

type	handbook reference	prod. code	cat. page
BFT45	S3	Sm	S36
BFT46	S5/S7	FET/Mm	S100/146
BFT92	S10/S7	WBT/Mm	S121/143
BFT93	S10/S7	WBT/Mm	S121/143
BFW10	S5	FET	S100
BFW11	S5	FET	S100
BFW12	S5	FET	S100
BFW13	S5	FET	S100
BFW16A	S10	WBT	S124
BFW17A	S10	WBT	S124
BFW30	S10	WBT	S124
BFW61	S5	FET	S100
BFW92	S10	WBT	S124
BFW92A	S10	WBT	S124
BFW93	S10	WBT	S124
BFX34	S3	Sm	S36
BFX89	S10	WBT	S124
BFY50	S3	Sm	S36
BFY51	S3	Sm	S36
BFY52	S3	Sm	S36
BFY55	S3	Sm	S36
BFY90	S10	WBT	S124
BG2000	S1	RT	S24
BG2097*	S1	RT	S24
BGD102	S10	WBM	S128
BGD102E	S10	WBM	S128
BGD104	S10	WBM	S128
BGD104E	S10	WBM	S128
BGD502	S10	WBM	S130
BGD504	S10	WBM	S130
BGX885	S10	WBM	S130
BGY22	S6	RFP	S110
BGY23	S6	RFP	S110
BGY32	S6	RFP	S110
BGY33	S6	RFP	S110
BGY35	S6	RFP	S110
BGY36	S6	RFP	S110
BGY40A	S6	RFP	S110
BGY40B	S6	RFP	S110
BGY41A	S6	RFP	S110
BGY41B	S6	RFP	S110
BGY43	S6	RFP	S110
BGY45A	S6	RFP	S110
BGY45B	S6	RFP	S110
BGY45C	S6	RFP	S110

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type	handbook reference	prod. code	cat. page
BGY46A	S6	RFP	S110
BGY46B	S6	RFP	S110
BGY46D	S6	RFP	S110
BGY47*	S6	RFP	S110
BGY48*	S6	RFP	S110
BGY49A	S6	RFP	S110
BGY49B	S6	RFP	S110
BGY50	S10	WBM	S126
BGY51	S10	WBM	S126
BGY52	S10	WBM	S126
BGY53	S10	WBM	S126
BGY54	S10	WBM	S126
BGY55	S10	WBM	S126
BGY56	S10	WBM	S126
BGY57	S10	WBM	S126
BGY58	S10	WBM	S126
BGY58A	S10	WBM	S126
BGY59	S10	WBM	S126
BGY60	S10	WBM	S126
BGY61	S10	WBM	S130
BGY65	S10	WBM	S130
BGY67	S10	WBM	S130
BGY67A	S10	WBM	S130
BGY80	S10	WBM	S128
BGY81	S10	WBM	S128
BGY84	S10	WBM	S128
BGY84A	S10	WBM	S128
BGY84H	S10	WBM	S128
BGY85	S10	WBM	S128
BGY85A	S10	WBM	S128
BGY85H	S10	WBM	S128
BGY86	S10	WBM	S128
BGY87	S10	WBM	S128
BGY88	S10	WBM	S128
BGY90A	S6	RFP	S110
BGY90B	S6	RFP	S110
BGY91A	S6	RFP	S110
BGY91B	S6	RFP	S110
BGY93*	S6	RFP	S110
BGY94*	S6	RFP	S110
BGY95A	S6	RFP	S110
BGY95B	S6	RFP	S110
BGY96A	S6	RFP	S110
BGY96B	S6	RFP	S110
BGY110A	S6	RFP	S110

type	handbook reference	prod. code	cat. page
BGY110B	S6	RFP	S110
BGY580	S10	WBM	S128
BGY581	S10	WBM	S128
BGY584	S10	WBM	S128
BGY584A	S10	WBM	S128
BGY585	S10	WBM	S128
BGY585A	S10	WBM	S128
BGY586	S10	WBM	S128
BGY587	S10	WBM	S128
BGY588	S10	WBM	S128
BLF146	S6	RFP/FET	S107
BLF242	S6	RFP/FET	S109
BLF244	S6	RFP/FET	S109
BLF245	S6	RFP/FET	S109
BLT90/SL	S6	RFP	S112
BLT91/SL	S6	RFP	S112
BLT92/SL	S6	RFP	S112
BLU20/12	S6	RFP	S111
BLU30/12	S6	RFP	S111
BLU45/12	S6	RFP	S111
BLU50	S6	RFP	S111
BLU51	S6	RFP	S111
BLU52	S6	RFP	S111
BLU53	S6	RFP	S111
BLU60/12	S6	RFP	S111
BLU97	S6	RFP	S111
BLU98	S6	RFP	S112
BLU99	S6	RFP	S111/112
BLV10	S6	RFP	S108/109
BLV11	S6	RFP	S107/109
BLV20	S6	RFP	S108/109
BLV21	S6	RFP	S107/112
BLV25	S6	RFP	S112
BLV30	S6	RFP	S113
BLV31	S6	RFP	S113
BLV32F	S6	RFP	S113
BLV33	S6	RFP	S113
BLV33F	S6	RFP	S113
BLV36	S6	RFP	S113
BLV37	S6	RFP	S113
BLV38	S6	RFP	S113
BLV45/12	S6	RFP	S109
BLV57	S6	RFP	S113
BLV59	S6	RFP	S113
BLV75/12	S6	RFP	S109

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BLV80/28	S6	RFP	S109
BLV90	S6	RFP	S112
BLV90/SL	S6	RFP	S112
BLV91	S6	RFP	S112
BLV91/SL	S6	RFP	S112
BLV92	S6	RFP	S112
BLV93	S6	RFP	S112
BLV94	S6	RFP	S112
BLV95	S6	RFP	S112
BLV97	S6	RFP	S112
BLV98	S6	RFP	S112
BLV99	S6	RFP	S112
BLW29	S6	RFP	S109
BLW31	S6	RFP	S109
BLW32	S6	RFP	S113
BLW33	S6	RFP	S113
BLW34	S6	RFP	S113
BLW50F	S6	RFP	S107/108
BLW60	S6	RFP	S107/109
BLW60C	S6	RFP	S107/109
BLW76	S6	RFP	S107/109
BLW77	S6	RFP	S107/109
BLW78	S6	RFP	S107/112
BLW79	S6	RFP	S111
BLW80	S6	RFP	S111
BLW81	S6	RFP	S111
BLW83	S6	RFP	S107/108
BLW84	S6	RFP	S109
BLW85	S6	RFP	S107/109
BLW86	S6	RFP	S107/112
BLW87	S6	RFP	S107/109
BLW89	S6	RFP	S111
BLW90	S6	RFP	S111/112
BLW91	S6	RFP	S111
BLW95	S6	RFP	S107/109
BLW96	S6	RFP	S107/109
BLW97	S6	RFP	S107
BLW98	S6	RFP	S113
BLW99	S6	RFP	S107
BLX13	S6	RFP	S107/108
BLX13C	S6	RFP	S107/108
BLX14	S6	RFP	S107
BLX15	S6	RFP	S107/109
BLX39	S6	RFP	S107/112
BLX65	S6	RFP	S111

type	handbook reference	prod. code	cat. page
BLX65E	S6	RFP	S111
BLX67	S6	RFP	S111
BLX68	S6	RFP	S111
BLX69A	S6	RFP	S111
BLX91A	S6	RFP	S111
BLX91CB	S6	RFP	S118
BLX92A	S6	RFP	S111
BLX93A	S6	RFP	S111
BLX94A	S6	RFP	S111
BLX94C	S6	RFP	S111
BLX95	S6	RFP	S111
BLX96	S6	RFP	S118
BLX97	S6	RFP	S118
BLX98	S6	RFP	S118
BLY87A	S6	RFP	S108/109
BLY87C	S6	RFP	S108/109
BLY88A	S6	RFP	S107/109
BLY88C	S6	RFP	S107/109
BLY89A	S6	RFP	S107/109
BLY89C	S6	RFP	S107/109
BLY90	S6	RFP	S109
BLY91A	S6	RFP	S108/109
BLY91C	S6	RFP	S108/109
BLY92A	S6	RFP	S107/109
BLY92C	S6	RFP	S107/109
BLY93A	S6	RFP	S109
BLY93C	S6	RFP	S109
BLY94	S6	RFP	S109
BPW22A*	S8a/b	PDT	S165
BPW50	S8a/b	PDT	S165
BR100	S2b	Th	S30
BRY39	S2a	Th/Sm	S30/40
BRY56	S3	Sm	S40
BRY61	S7	Mm	S146
BRY62	S7	Mm	S146
BS107;A	S5	FET	S105
BS170	S5	FET	S105
BS250	S5	FET	S105
BSD10	S5	FET	S104
BSD12	S5	FET	S104
BSD20	S5/S7	FET/Mm	S104/146
BSD22	S5/S7	FET/Mm	S104/146
BSD212	S5	FET	S104
BSD213	S5	FET	S104
BSD214	S5	FET	S104

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BSD215	S5	FET	S104
BSJ174	S5	FET	S101
BSJ175	S5	FET	S101
BSJ176	S5	FET	S101
BSJ177	S5	FET	S101
BSN254A	S5	FET	S105
BSP204A	S5	FET	S105
BSP254A	S5	FET	S105
BSP304A	S5	FET	S105
BSR12	S7	Mm	S144
BSR13	S7	Mm	S144
BSR14	S7	Mm	S144
BSR15	S7	Mm	S144
BSR16	S7	Mm	S144
BSR17	S7	Mm	S144
BSR17A	S7	Mm	S144
BSR18	S7	Mm	S144
BSR18A	S7	Mm	S144
BSR19	S7	Mm	S144
BSR19A	S7	Mm	S144
BSR20	S7	Mm	S144
BSR20A	S7	Mm	S144
BSR30	S7	Mm	S144
BSR31	S7	Mm	S144
BSR32	S7	Mm	S144
BSR33	S7	Mm	S144
BSR40	S7	Mm	S144
BSR41	S7	Mm	S144
BSR42	S7	Mm	S144
BSR43	S7	Mm	S144
BSR50	S3	Sm	S36
BSR51	S3	Sm	S36
BSR52	S3	Sm	S36
BSR56	S5/S7	FET/Mm	S103/146
BSR57	S5/S7	FET/Mm	S103/146
BSR58	S5/S7	FET/Mm	S103/146
BSR60	S3	Sm	S36
BSR61	S3	Sm	S36
BSR62	S3	Sm	S36
BSR174	S5/S7	FET/Mm	S101/146
BSR175	S5/S7	FET/Mm	S101/146
BSR176	S5/S7	FET/Mm	S101/146
BSR177	S5/S7	FET/Mm	S101/146
BSS38	S3	Sm	S36
BSS50	S3	Sm	S36

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BSS51	S3	Sm	S36
BSS52	S3	Sm	S36
BSS60	S3	Sm	S37
BSS61	S3	Sm	S37
BSS62	S3	Sm	S37
BSS63	S7	Mm	S144
BSS64	S7	Mm	S144
BSS68	S3	Sm	S37
BSS83	S5/S7	FET/Mm	S104/146
BSS87	S5	FET	S105
BSS89	S5	FET	S105
BSS91	S5	FET	S105
BSS92	S5	FET	S105
BSS192	S5	FET	S105
BST15	S7	Mm	S145
BST16	S7	Mm	S145
BST39	S7	Mm	S145
BST40	S7	Mm	S145
BST50	S7	Mm	S144
BST51	S7	Mm	S144
BST52	S7	Mm	S144
BST60	S7	Mm	S144
BST61	S7	Mm	S144
BST62	S7	Mm	S144
BST70A	S5	FET	S105
BST72A	S5	FET	S105
BST74A	S5	FET	S105
BST76A	S5	FET	S105
BST80	S5/S7	FET/Mm	S105/146
BST82	S5/S7	FET/Mm	S105/146
BST84	S5/S7	FET/Mm	S105/146
BST86	S5/S7	FET/Mm	S105/146
BST100	S5	FET	S105
BST110	S5	FET	S105
BST120	S5/S7	FET/Mm	S105/146
BST122	S5/S7	FET/Mm	S105/146
BSV15*	S3	Sm	S37
BSV16*	S3	Sm	S37
BSV17	S3	Sm	S37
BSV52	S7	Mm	S144
BSV64	S3	Sm	S37
BSV78	S5	FET	S103
BSV79	S5	FET	S103
BSV80	S5	FET	S103
BSV81	S5	FET	S104

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type	handbook reference	prod. code	cat. page
BSW66A	S3	Sm	S37
BSW67A	S3	Sm	S37
BSW68A	S3	Sm	S37
BSX20	S3	Sm	S37
BSX45*	S3	Sm	S37
BSX46*	S3	Sm	S37
BSX47	S3	Sm	S37
BSX59	S3	Sm	S37
BSX60	S3	Sm	S37
BSX61	S3	Sm	S37
BT134*	S2b	Tri	S25/29
BT136*	S2b	Tri	S25/29
BT137*	S2b	Tri	S25/29
BT138*	S2b	Tri	S25/29
BT139*	S2b	Tri	S25/29
BT145*	S2b	Tri	S25/27
BT148*	S2b	Th	S25/26
BT150	S2b	Th	S25/26
BT151*	S2b	Th	S25/26
BT152*	S2b	Th	S25/27
BT157*	S2b	Th	S25/28
BT169*	S2b	Th	S25/26
BTA140*	S2b	Th	S25/29
BTR59*	S2b	Th	S25/28
BTS59*	S2b	Th	S25/28
BTV58*	S2b	Th	S25/28
BTW38*	S2b	Th	S25/26
BTW40*	S2b	Th	S25/27
BTW42*	S2b	Th	S25/26
BTW43G*	S2b	Tri	S25/29
BTW43H*	S2b	Tri	S25/29
BTW45*	S2b	Th	S25/27
BTW58*	S2b	Th	S25/28
BTY79*	S2b	Th	S25/26
BTY91*	S2b	Th	S25/27
BU304F	S4b	SP	S55
BU305F	S4b	SP	S55
BU306	S4b	SP	S56
BU306F	S4b	SP	S56
BU406	S4b	SP	S53
BU407	S4b	SP	S53
BU505;D	S4b	SP	S54
BU506	S4b	SP	S55
BU506D	S4b	SP	S55
BU506DF	S4b	SP	S55

type	handbook reference	prod. code	cat. page
BU506F	S4b	SP	S55
BU508	S4b	SP	S56
BU508A	S4b	SP	S56
BU508AF	S4b	SP	S56
BU508D	S4b	SP	S56
BU508DF	S4b	SP	S56
BU705	S4b	SP	S54
BU706	S4b	SP	S55
BU706D	S4b	SP	S55
BU706DF	S4b	SP	S55
BU706F	S4b	SP	S55
BU724A	S4b	SP	S54
BU806;A	S4b	SP	S49
BU807	S4b	SP	S49
BU808	S4b	SP	S57
BU826;A	S4b	SP	S55
BU903	S4b	SP	S55
BU903F	S4b	SP	S55
BUK426*	S9	PM	S58
BUK427*	S9	PM	S58
BUK436*	S9	PM	S58
BUK437*	S9	PM	S58
BUK442*	S9	PM	S59
BUK443*	S9	PM	S59
BUK444*	S9	PM	S59
BUK445*	S9	PM	S59
BUK446*	S9	PM	S59
BUK452*	S9	PM	S60
BUK453*	S9	PM	S60
BUK454*	S9	PM	S60
BUK456*	S9	PM	S60
BUK457*	S9	PM	S60
BUK462*	S9	PM	S61
BUK463*	S9	PM	S61
BUK464*	S9	PM	S61
BUK542*	S9	PM	S61
BUK543*	S9	PM	S61
BUK545*	S9	PM	S61
BUK552*	S9	PM	S62
BUK553*	S9	PM	S62
BUK554*	S9	PM	S62
BUK555*	S9	PM	S62
BUK562*	S9	PM	S62
BUK563*	S9	PM	S62
BUK564*	S9	PM	S62

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type	handbook reference	prod. code	cat. page
BUK627*	S9	PM	S63
BUK637*	S9	PM	S63
BUK655*	S9	PM	S63
BUK657*	S9	PM	S63
BUP23B	S4b	SP	S57
BUP23C	S4b	SP	S57
BUS11;A	S4b	SP	S55
BUS12;A	S4b	SP	S56
BUS13;A	S4b	SP	S57
BUS14;A	S4b	SP	S57
BUS22	S4b	SP	S56
BUS23	S4b	SP	S57
BUS24*	S4b	SP	S57
BUT11;A	S4b	SP	S55
BUT11F;AF	S4b	SP	S55
BUT12;A	S4b	SP	S56
BUT18;A	S4b	SP	S55
BUT18F;AF	S4b	SP	S55
BUV26;A*	S4b	SP	S53
BUV27;A*	S4b	SP	S53
BUV28;A	S4b	SP	S56
BUV28F;AF	S4b	SP	S56
BUV89	S4b	SP	S56
BUV90	S4b	SP	S57
BUV98(V);A	S4b	SP	S57
BUV298(V);A	S4b	SP	S57
BUW11;A	S4b	SP	S55
BUW11F;AF	S4b	SP	S55
BUW12;A	S4b	SP	S56
BUW12F;AF	S4b	SP	S56
BUW13;A	S4b	SP	S57
BUW13F;AF	S4b	SP	S57
BUW84	S4b	SP	S54
BUW85	S4b	SP	S54
BUX46;A	S4b	SP	S55
BUX47;A	S4b	SP	S56
BUX48;A	S4b	SP	S57
BUX79	S4b	SP	S54
BUX84	S4b	SP	S54
BUX85	S4b	SP	S54
BUX86	S4b	SP	S54
BUX87	S4b	SP	S54
BUX88	S4b	SP	S57
BUX98;A	S4b	SP	S57
BUX99	S4b	SP	S54
BUY89	S4b	SP	S55
BY228	S1	R	S9/23
BY229*	S2a	R	S9/19
BY229F*	S2a	R	S19
BY249*	S2a	R	S9/22
BY328	S1	SD	S9/23
BY329*	S2a	R	S9/19
BY359*	S2a	R	S9/19
BY438	S1	R	S9
BY448	S1	R	S9/23
BY458	S1	R	S9/23
BY505	S1	R	S10/24
BY509	S1	R	S10/24
BY527	S1	R	S9/20
BY584	S1	R	S10/24
BY588	S1	R	S9/23
BY609	S1	R	S10/24
BY610	S1	R	S10/24
BY614	S1	R	S10/24
BY619	S1	R	S10/24
BY620	S1	R	S10/24
BY627	S1	R	S9/20
BY705	S1	R	S10/24
BY706	S1	R	S10/24
BY707	S1	R	S10/24
BY708	S1	R	S10/24
BY709	S1	R	S10/24
BY710	S1	R	S10/24
BY711	S1	R	S10/24
BY712	S1	R	S10/24
BY713	S1	R	S10/24
BY714	S1	R	S10/24
BY715	S1	R	S10/24
BY716	S1	R	S10/24
BY717	S1	R	S10/24
BY718	S1	R	S10/24
BY719	S1	R	S10/24
BY720	S1	R	S10/24
BY721	S1	R	S10/24
BY722	S1	R	S10/24
BY723	S1	R	S10/24
BY724	S1	R	S10/24
BYD11*	S1	R	S9/20
BYD13*	S1	R	S9/20
BYD14*	S1	R	S9/20

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type	handbook reference	prod. code	cat. page
BYD17*	S1/S7	R/Mm	S9/149
BYD31*	S1	R	S8/17
BYD33*	S1	R	S8/17
BYD34*	S1	R	S8/17
BYD37*	S1/S7	R/Mm	S8/149
BYD73*	S1	R	S8/12
BYD74*	S1	R	S8/12
BYD77*	S1/S7	R/Mm	S8/149
BYM26*	S1	R	S8/12
BYM36*	S1	R	S8/13
BYM56*	S1	R	S9/21
BYP20*	S2a	R	S8
BYP21*	S2a	R	S8/16
BYP22*	S2a	R	S8/16
BYQ28*	S2a	R	S8/13
BYR29*	S2a	R	S8/14
BYR735	S2a	R	S7/11
BYR740	S2a	R	S7/11
BYR745	S2a	R	S7/11
BYR1035	S2a	R	S7/11
BYR1040	S2a	R	S7/11
BYR1045	S2a	R	S7/11
BYR1535CT	S2a	R	S7/11
BYR1540CT	S2a	R	S7/11
BYR1545CT	S2a	R	S7/11
BYR1635	S2a	R	S7/11
BYR1640	S2a	R	S7/11
BYR1645	S2a	R	S7/11
BYR2035CT	S2a	R	S7/11
BYR2040CT	S2a	R	S7/11
BYR2045CT	S2a	R	S7/11
BYR3035CT	S2a	R	S7/11
BYR3040CT	S2a	R	S7/11
BYR3045CT	S2a	R	S7/11
BYT28*	S2a	R	S8/14
BYT79*	S2a	R	S8/14
BYT230PIV	S1	R	S8/16
BYV24*	S2a	R	S9/19
BYV26*	S1/S2a	R	S8/12
BYV27*	S1/S2a	R	S8/12
BYV28*	S1/S2a	R	S8/13
BYV29*	S2a	R	S8/14
BYV30*	S2a	R	S8/14
BYV31*	S2a	R	S8/15
BYV32*	S2a	R	S8/14

type	handbook reference	prod. code	cat. page
BYV34*	S2a	R	S8/14
BYV36*	S1	R	S8/12
BYV42*	S2a	R	S8/15
BYV44*	S2a	R	S8/15
BYV54V*	S1	R	S8/16
BYV72*	S2a	R	S8/15
BYV74*	S2a	R	S8/15
BYV79*	S2a	R	S8/14
BYV92*	S2a	R	S8/15
BYV95*	S1	R	S8/17
BYV96*	S1	R	S8/17
BYV117*	S2a	R	S7/11
BYV120*	S2a	R	S7/11
BYV121*	S2a	R	S7/11
BYV133*	S2a	R	S7/11
BYV143*	S2a	R	S7/11
BYW29*	S2a	R	S8/14
BYW30*	S2a	R	S8/14
BYW31*	S2a	R	S8/15
BYW54	S1	R	S9/20
BYW55	S1	R	S9/20
BYW56	S1	R	S9/20
BYW92*	S2a	R	S8/15
BYW93*	S2a	R	S8/15
BYW95*	S1	R	S8/17
BYW96*	S1	R	S8/17
BYX10G	S1	R	S9/23
BYX25*	S2a	R	S9/21
BYX30*	S2a	R	S8/18
BYX38*	S2a	R	S9/22
BYX39*	S2a	R	S9/21
BYX42*	S2a	R	S9/22
BYX46*	S2a	R	S8/18
BYX50*	S2a	R	S8/17
BYX52*	S2a	R	S9/22
BYX56*	S2a	R	S9/21
BYX90G	S1	R	S10/24
BYX96*	S2a	R	S9/22
BYX97*	S2a	R	S9/22
BYX98*	S2a	R	S9/22
BYX99*	S2a	R	S9/22
BZD23*	S1	Vrg	S6
BZD27*	S1/S7	Vrg/Mm	S6/147
BZT03*	S1	Vrg	S6
BZV10	S1	Vrf	S5

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type	handbook reference	prod. code	cat. page
BZV11	S1	Vrf	S5
BZV12	S1	Vrf	S5
BZV13	S1	Vrf	S5
BZV14	S1	Vrf	S5
BZV37	S1	Vrg	S6
BZV46	S1	Vrf	S5
BZV49*	S1/S7	Vrg/Mm	S148
BZV55*	S7	Mm	S148
BZV85*	S1	Vrg	S6
BZW03*	S1	Vrg	S6
BZW14	S1	Vrg	S6
BZX55*	S1	Vrg	S6
BZX79*	S1	Vrg	S6
BZX84*	S1/S7	Vrg/Mm	S148
CFX16*	S11	M	S202
CFX17*	S11	M	S202
CFX22	S11	M	S202
CFX30	S11	M	S202
CFX31	S11	M	S202
CFX32	S11	M	S202
CFX33*	S11	M	S202
CNG35	S8b	PhC	S177
CNG36	S8b	PhC	S177
CNG82	S8b	PhC	S178
CNG83	S8b	PhC	S178
CNR36	S8b	PhC	S179
CNW82	S8b	PhC	S179
CNW83	S8b	PhC	S179
CNX21	S8b	PhC	S177
CNX35	S8b	PhC	S174
CNX35U	S8b	PhC	S173
CNX36	S8b	PhC	S174
CNX36U	S8b	PhC	S173
CNX38	S8b	PhC	S174
CNX38U	S8b	PhC	S173
CNX39	S8b	PhC	S174
CNX39U	S8b	PhC	S173
CNX48	S8b	PhC	S174
CNX48U	S8b	PhC	S173
CNX62	S8b	PhC	S177
CNX62A	S8b	PhC	S179
CNX71	S8b	PhC	S177
CNX72	S8b	PhC	S177
CNX72A	S8b	PhC	S179
CNX82	S8b	PhC	S177
CNX82A	S8b	PhC	S179
CNX83	S8b	PhC	S177
CNX83A	S8b	PhC	S179
CNY17–1	S8b	PhC	S176
CNY17–2	S8b	PhC	S176
CNY17–3	S8b	PhC	S176
CNY57	S8b	PhC	S174
CNY57A	S8b	PhC	S174
CNY57AU	S8b	PhC	S173
CNY57U	S8b	PhC	S173
CQF22/D31	S8b	PhC	S162
CQF23/D21	S8b	PhC	S162
CQF24	S8b	PhC	S164
CQF25A/D21	S8b	PhC	S162
CQF26H/D27	S8b	PhC	S162
CQF27A/D21	S8b	PhC	S162
CQF40	S8b	PhC	S162
CQF41	S8b	PhC	S162
CQF42	S8b	PhC	S164
CQF45	S8b	PhC	S164
CQF46	S8b	PhC	S164
CQF47	S8b	PhC	S164
CQF48	S8b	PhC	S164
CQF50	S8b	PhC	S162
CQF51	S8b	PhC	S162
CQF52	S8b	PhC	S162
CQF53	S8b	PhC	S162
CQF55	S8b	PhC	S162
CQF56	S8b	PhC	S162
CQF58	S8b	PhC	S162
CQF60	S8b	PhC	S162
CQF61	S8b	PhC	S162
CQL20	S8b	Ph	S158
CQL21	S8b	Ph	S158
CQL30	S8b	Ph	S160
CQL60A	S8b	Ph	S158
CQL61A	S8b	Ph	S158
CQL62A	S8b	Ph	S158
CQL63A	S8b	Ph	S158
CQL70A	S8b	Ph	S160
CQL71A	S8b	Ph	S160
CQL72A	S8b	Ph	S160
CQL73	S8b	Ph	S160
CQL75	S8b	Ph	S160
CQW58A*	S8a	I	S166/

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type	handbook reference	prod. code	cat. page
CQW89A*	S8a	I	S166
CQW89B	S8a	I	S169
CQY58A*	S8a	I	S166
CQY89A*	S8a	I	S166
CQY89F*	S8a	I	S166/172
CQY90A	S8a	I	S166
ESM3045A(V)	S4b	SP	S57
ESM3045D(V)	S4b	SP	S57
ESM4045A(V)	S4b	SP	S57
ESM4045D(V)	S4b	SP	S57
ESM5045D(V)	S4b	SP	S57
ESM6045A(V)	S4b	SP	S57
ESM6045D(V)	S4b	SP	S57
H11A1	S8b	PhC	S174
H11A2	S8b	PhC	S174
H11A3	S8b	PhC	S174
H11A4	S8b	PhC	S174
H11A5	S8b	PhC	S174
H11B1	S8b	PhC	S176
H11B2	S8b	PhC	S176
H11B3	S8b	PhC	S176
H11B255	S8b	PhC	S176
KMZ10A*	S13	SEN	S206
KMZ10B	S13	SEN	S206
KMZ10C	S13	SEN	S206
KP100A*	S13	SEN	S206
KP101A*	S13	SEN	S206
KPZ20G	S13	SEN	S206
KPZ21G;GE	S13	SEN	S206
KTY81–100*	S13	SEN	S204
KTY81–200*	S13	SEN	S204
KTY83–100*	S13	SEN	S204
KTY84–100*	S13	SEN	S205
KTY85–100*	S13	SEN	S205
KTY86–205	S13	SEN	S205
KTY87–205	S13	SEN	S205
LAE4001R	S11	M	S196
LAE4002S	S11	M	S196
LAE6000Q	S11	M	S196
LBE2003S	S11	M	S196
LBE2009S	S11	M	S196
LBG402*	S14	LCD	S184
LBG403*	S14	LCD	S184
LCE2003S	S11	M	S196
LCE2009S	S11	M	S196

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LP–1471–B	S14	LCD	S184
LTA141*	S14	LCD	S182
LTA142U–12	S14	LCD	S182
LTA331*	S14	LCD	S182
LTA332*	S14	LCD	S182
LTA341*	S14	LCD	S182
LTA342*	S14	LCD	S182
LTA343*	S14	LCD	S182
LTD101R–11	S14	LCD	S182
LTD132R–11	S14	LCD	S182
LTD133F–21	S14	LCD	S182
LTD201R–11	S14	LCD	S182
LTD202*	S14	LCD	S182
LTD203*	S14	LCD	S182
LTD211*	S14	LCD	S182
LTD221*	S14	LCD	S182
LTD222*	S14	LCD	S182
LTD224R–11	S14	LCD	S182
LTD225R–11	S14	LCD	S182
LTD226*	S14	LCD	S182
LTD227*	S14	LCD	S183
LTD228R–11	S14	LCD	S183
LTD229*	S14	LCD	S183
LTD231R–11	S14	LCD	S183
LTD232R–11	S14	LCD	S183
LTD233R–11	S14	LCD	S183
LTD234R–11	S14	LCD	S183
LTD241*	S14	LCD	S183
LTD242*	S14	LCD	S183
LTD261*	S14	LCD	S183
LTD262*	S14	LCD	S183
LTD263*	S14	LCD	S183
LTD264*	S14	LCD	S183
LTD321R–12	S14	LCD	S183
LTD351R–11	S14	LCD	S183
LTE21009R	S11	M	S196
LTE21015R	S11	M	S196
LTE21025R	S11	M	S196
LTE4002S	S11	M	S196
LTE42005S	S11	M	S196
LTE42008R	S11	M	S196
LTE42012R	S11	M	S196
LTG201R–10	S14	LCD	S184
LTM233R–10	S14	LCD	S184
LTN111*	S14	LCD	S184

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type	handbook reference	prod. code	cat. page
LTN211*	S14	LCD	S184
LTN242*	S14	LCD	S184
LUE2003S	S11	M	S196
LUE2009S	S11	M	S196
LV1721E50R	S11	M	S197
LV2024E45R	S11	M	S197
LV2327E40R	S11	M	S197
LV2931E50S	S11	M	S197
LVE21050R	S11	M	S196
LWE2015R	S11	M	S196
LWE2025R	S11	M	S196
LZ1418E100R	S11	M	S197
MCT2	S8b	PhC	S174
MCT26	S8b	PhC	S175
MJE13004	S4b	SP	S55
MJE13005	S4b	SP	S55
MJE13006	S4b	SP	S56
MJE13007	S4b	SP	S56
MJE13008	S4b	SP	S57
MJE13009	S4b	SP	S57
MPS6513	S3	Sm	S32
MPS6514	S3	Sm	S32
MPS6515	S3	Sm	S32
MPS6517	S3	Sm	S32
MPS6518	S3	Sm	S32
MPS6519	S3	Sm	S32
MPS6520	S3	Sm	S32
MPS6521	S3	Sm	S32
MPS6522	S3	Sm	S32
MPS6523	S3	Sm	S32
MPSA05	S3	Sm	S32
MPSA06	S3	Sm	S32
MPSA13	S3	Sm	S37
MPSA14	S3	Sm	S37
MPSA42	S3	Sm	S35/37
MPSA43	S3	Sm	S35/37
MPSA55	S3	Sm	S32
MPSA56	S3	Sm	S32
MPSA63	S3	Sm	S37
MPSA64	S3	Sm	S37
MPSA92	S3	Sm	S35/37
MPSA93	S3	Sm	S35/37
MRB11080Y	S11	M	S201
MRB11175Y	S11	M	S201
MRB11350Y	S11	M	S201

type	handbook reference	prod. code	cat. page
MRB11900Y	S11	M	S201
OF945*	S8b	Ph	S160
OM286;M	S13	SEN	S135
OM287;M	S13	SEN	S135
OM320	S10	WBM	S134
OM321	S10	WBM	S134
OM322	S10	WBM	S134
OM323	S10	WBM	S134
OM323A	S10	WBM	S134
OM335	S10	WBM	S134
OM336	S10	WBM	S134
OM337	S10	WBM	S134
OM337A	S10	WBM	S134
OM339	S10	WBM	S134
OM345	S10	WBM	S134
OM350	S10	WBM	S134
OM360	S10	WBM	S134
OM361	S10	WBM	S134
OM370	S10	WBM	S134
OM386B	S13	SEN	S136
OM386M	S13	SEN	S137
OM387B	S13	SEN	S136
OM387M	S13	SEN	S137
OM388B	S13	SEN	S138
OM389B	S13	SEN	S138
OM390	S13	SEN	S139
OM391	S13	SEN	S139
OM931	S4a	P	S133
OM961	S4a	P	S133
OM991	S4a	P	S133
OM2045	S10	WBM	S134
OM2050	S10	WBM	S134
OM2060	S10	WBM	S134
OM2061	S10	WBM	S134
OM2070	S10	WBM	S134
P2105	S8b	I	S167
PH2222;A	S3	Sm	S38
PH2369	S3	Sm	S38
PH2907	S3	Sm	S38
PH2907A	S3	Sm	S38
PH5415	S3	Sm	S38
PH5416	S3	Sm	S38
PH6659	S5	FET	S105
PH6660	S5	FET	S105
PH6661	S5	FET	S105

* series

Alphanumeric type number index

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type	handbook reference	prod. code	cat. page
PH13002	S4b	SP	S54
PH13003	S4b	SP	S54
PLED–G313N*	S8a	LED	S168
PLED–G314N*	S8a	LED	S168
PLED–GR14P*	S8a	LED	S171
PLED–GR14R*	S8a	LED	S171
PLED–GR14T*	S8a	LED	S171
PLED–H313A*	S8a	LED	S168/170
PLED–H314A*	S8a	LED	S168/170
PLED–H511C*	S8a	LED	S169/170
PLED–H514B*	S8a	LED	S169/170
PLED–H544KL*	S8a	LED	S169
PLED–H544LL*	S8a	LED	S169
PLED–HR14E*	S8a	LED	S172
PLED–HR14F*	S8a	LED	S172
PLED–HR14G*	S8a	LED	S172
PLED–HR44DL*	S8a	LED	S172
PLED–O313N*	S8a	LED	S168
PLED–O314N*	S8a	LED	S168
PLED–OR14P*	S8a	LED	S171
PLED–OR14R*	S8a	LED	S171
PLED–OR14T*	S8a	LED	S171
PLED–P313N*	S8a	LED	S168
PLED–P314N*	S8a	LED	S168
PLED–PR14P*	S8a	LED	S171
PLED–PR14R*	S8a	LED	S171
PLED–PR14T*	S8a	LED	S171
PLED–T512B*	S8a	LED	S169
PLED–TR12E*	S8a	LED	S172
PLED–TR12F*	S8a	LED	S172
PLED–TR12G*	S8a	LED	S172
PLED–TR42DL*	S8a	LED	S172
PLED–Y313N*	S8a	LED	S168
PLED–Y314N*	S8a	LED	S168
PLED–YR14P*	S8a	LED	S171
PLED–YR14R*	S8a	LED	S171
PLED–YR14T*	S8a	LED	S171
PMBF4391	S5/S7	FET/Mm	S103/146
PMBF4392	S5/S7	FET/Mm	S103/146
PMBF4393	S5/S7	FET/Mm	S103/146
PMBT2222	S7	Mm	S144
PMBT2222A	S7	Mm	S144
PMBT2907	S7	Mm	S144
PMBT2907A	S7	Mm	S144
PMBT3903	S7	Mm	S144

type	handbook reference	prod. code	cat. page
PMBT3904	S7	Mm	S144
PMBT3906	S7	Mm	S144
PMBT6428	S7	Mm	S142
PMBT6429	S7	Mm	S142
PMBTA05	S7	Mm	S142
PMBTA06	S7	Mm	S142
PMBTA13	S7	Mm	S142
PMBTA14	S7	Mm	S142
PMBTA42	S7	Mm	S145
PMBTA43	S7	Mm	S145
PMBTA55	S7	Mm	S141
PMBTA56	S7	Mm	S141
PMBTA63	S7	Mm	S141
PMBTA64	S7	Mm	S141
PMBTA92	S7	Mm	S145
PMBTA93	S7	Mm	S145
PMLL5225B	S1/S7	SD	S6
to			
PMLL5267B	S1/S7	SD	S6
PN2222	S3	Sm	S38
PN2222A	S3	Sm	S38
PN2369	S3	Sm	S38
PN2369A	S3	Sm	S38
PN2907	S3	Sm	S38
PN2907A	S3	Sm	S38
PN3439	S3	Sm	S38
PN3440	S3	Sm	S38
PN5415	S3	Sm	S38
PN5416	S3	Sm	S38
PO40	S8b	PhC	S179
PO44	S8b	PhC	S179
PO44A	S8b	PhC	S179
PPC5001T	S11	M	S199
PQC5001T	S11	M	S199
PTB23001X	S11	M	S198
PTB23003X	S11	M	S198
PTB23005X	S11	M	S198
PTB32001X	S11	M	S198
PTB32003X	S11	M	S198
PTB32005X	S11	M	S198
PTB42001X	S11	M	S198
PTB42002X	S11	M	S198
PTB42003X	S11	M	S198
PVB42004X	S11	M	S198
PZ1418B15U	S11	M	S198

* series

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type	handbook reference	prod. code	cat. page
PZ1418B30U	S11	M	S198
PZ1721B12U	S11	M	S198
PZ1721B25U	S11	M	S198
PZ2024B10U	S11	M	S198
PZ2024B20U	S11	M	S198
PZ2327B15U	S11	M	S198
PZB16035U	S11	M	S198
PZB16040U	S11	M	S198
RPY100	S8b	I	S167
RPY101	S8b	I	S167
RPY102	S8b	I	S167
RPY103	S8b	I	S167
RPY107	S8b	I	S167
RPY109	S8b	I	S167
RV2833B5X	S11	M	S200
RV3135B5X	S11	M	S200
RX1011B250Y	S11	M	S201
RX1011B350Y	S11	M	S201
RX1214B150W	S11	M	S200
RX1214B300Y	S11	M	S200
RX3034470W	S11	M	S200
RXB12350Y	S11	M	S201
RZ1214B35Y	S11	M	S200
RZ1214B65Y	S11	M	S200
RZ1214B125Y	S11	M	S200
RZ2731B45W	S11	M	S200
RZ2731B60W	S11	M	S200
RZ2731B90W	S11	M	S200
RZ2833B15W	S11	M	S200
RZ2833B30W	S11	M	S200
RZ2833B45W	S11	M	S200
RZ2833B60W	S11	M	S200
RZ3135B15W	S11	M	S200
RZ3135B30W	S11	M	S200
RZ3135B40W	S11	M	S200
RZ3135B50W	S11	M	S200
RZB12050Y	S11	M	S201
RZB12100Y	S11	M	S201
RZB12250Y	S11	M	S201
SL5505S	S8b	PhC	S179
TIP29*	S4a	P	S51
TIP30*	S4a	P	S51
TIP31*	S4a	P	S52
TIP32*	S4a	P	S52
TIP33*	S4a	P	S53
TIP34*	S4a	P	S53
TIP47	S4b	P	S54
TIP48	S4b	P	S54
TIP49	S4b	P	S54
TIP50	S4b	P	S54
TIP110	S4a	P	S49
TIP111	S4a	P	S49
TIP112	S4a	P	S49
TIP115	S4a	P	S49
TIP116	S4a	P	S49
TIP117	S4a	P	S49
TIP120	S4a	P	S49
TIP121	S4a	P	S49
TIP122	S4a	P	S49
TIP125	S4a	P	S49
TIP126	S4a	P	S49
TIP127	S4a	P	S49
TIP130	S4a	P	S49
TIP131	S4a	P	S49
TIP132	S4a	P	S49
TIP135	S4a	P	S49
TIP136	S4a	P	S49
TIP137	S4a	P	S49
TIP140	S4a	P	S49
TIP141	S4a	P	S49
TIP142	S4a	P	S49
TIP145	S4a	P	S49
TIP146	S4a	P	S49
TIP147	S4a	P	S49
TIP2955	S4a	P	S53
TIP3055	S4a	P	S53
1N821	S1	Vrf	S5
1N823	S1	Vrf	S5
1N825	S1	Vrf	S5
1N827	S1	Vrf	S5
1N829	S1	Vrf	S5
1N914	S1	SD	S1
1N916	S1	SD	S1
1N3879	S2a	R	S8/17
1N3880	S2a	R	S8/17
1N3881	S2a	R	S8/17
1N3882	S2a	R	S8/17
1N3883	S2a	R	S8/17
1N3889	S2a	R	S8/17
1N3890	S2a	R	S8/17

* series

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type	handbook reference	prod. code	cat. page
1N3891	S2a	R	S8/17
1N3892	S2a	R	S8/17
1N3893	S2a	R	S17
1N3909	S2a	R	S8/18
1N3910	S2a	R	S8/18
1N3911	S2a	R	S8/18
1N3912	S2a	R	S8/18
1N3913	S2a	R	S8/18
1N4001ID– 1N4007ID	S1	R	S9/20
1N4007ID	S1	R	S9/20
1N4148	S1	SD	S1
1N4150	S1	SD	S1
1N4151	S1	SD	S1
1N4153	S1	SD	S1
1N4446	S1	SD	S1
1N4448	S1	SD	S1
1N4531	S1	SD	S1
1N4532	S1	SD	S1
1N4933	S1	R	S8/17
1N4934	S1	R	S8/17
1N4935	S1	R	S8/17
1N4936	S1	R	S8/17
1N4937	S1	R	S8/17
1N5059	S1	R	S9/20
1N5060	S1	R	S9/20
1N5061	S1	R	S9/20
1N5062	S1	R	S9/20
1N5225B– 1N5267B	S1	R	S6
1N5267B	S1	R	S6
2N918	S10	WBT	S124
2N930	S3	Sm	S33
2N1613	S3	Sm	S38
2N1711	S3	Sm	S38
2N1893	S3	Sm	S38
2N2219	S3	Sm	S38
2N2219A	S3	Sm	S38
2N2222	S3	Sm	S38
2N2222A	S3	Sm	S38
2N2297	S3	Sm	S38
2N2369	S3	Sm	S38
2N2369A	S3	Sm	S38
2N2484	S3	Sm	S33
2N2904	S3	Sm	S38
2N2904A	S3	Sm	S38
2N2905	S3	Sm	S38
2N2905A	S3	Sm	S38
2N2906	S3	Sm	S39
2N2906A	S3	Sm	S39
2N2907	S3	Sm	S39
2N2907A	S3	Sm	S39
2N3019	S3	Sm	S33/39
2N3020	S3	Sm	S39
2N3053	S3	Sm	S39
2N3375	S6	RFP	S119
2N3553	S6	RFP	S119
2N3632	S6	RFP	S119
2N3822	S5	FET	S100
2N3823	S5	FET	S100
2N3866	S6	RFP	S109/112
2N3903	S3	Sm	S39
2N3904	S3	Sm	S39
2N3905	S3	Sm	S39
2N3906	S3	Sm	S39
2N3924	S6	RFP	S119
2N3926	S6	RFP	S119
2N3927	S6	RFP	S119
2N3966	S5	FET	S103
2N4030	S3	Sm	S33/39
2N4031	S3	Sm	S33/39
2N4032	S3	Sm	S33/39
2N4033	S3	Sm	S33/39
2N4091	S5	FET	S103
2N4092	S5	FET	S103
2N4093	S5	FET	S103
2N4123	S3	Sm	S33
2N4124	S3	Sm	S33
2N4125	S3	Sm	S33
2N4126	S3	Sm	S33
2N4391	S5	FET	S103
2N4392	S5	FET	S103
2N4393	S5	FET	S103
2N4400	S3	Sm	S33
2N4401	S3	Sm	S33
2N4402	S3	Sm	S33
2N4403	S3	Sm	S33
2N4427	S6	RFP	S109
2N4856	S5	FET	S103
2N4857	S5	FET	S103

* series

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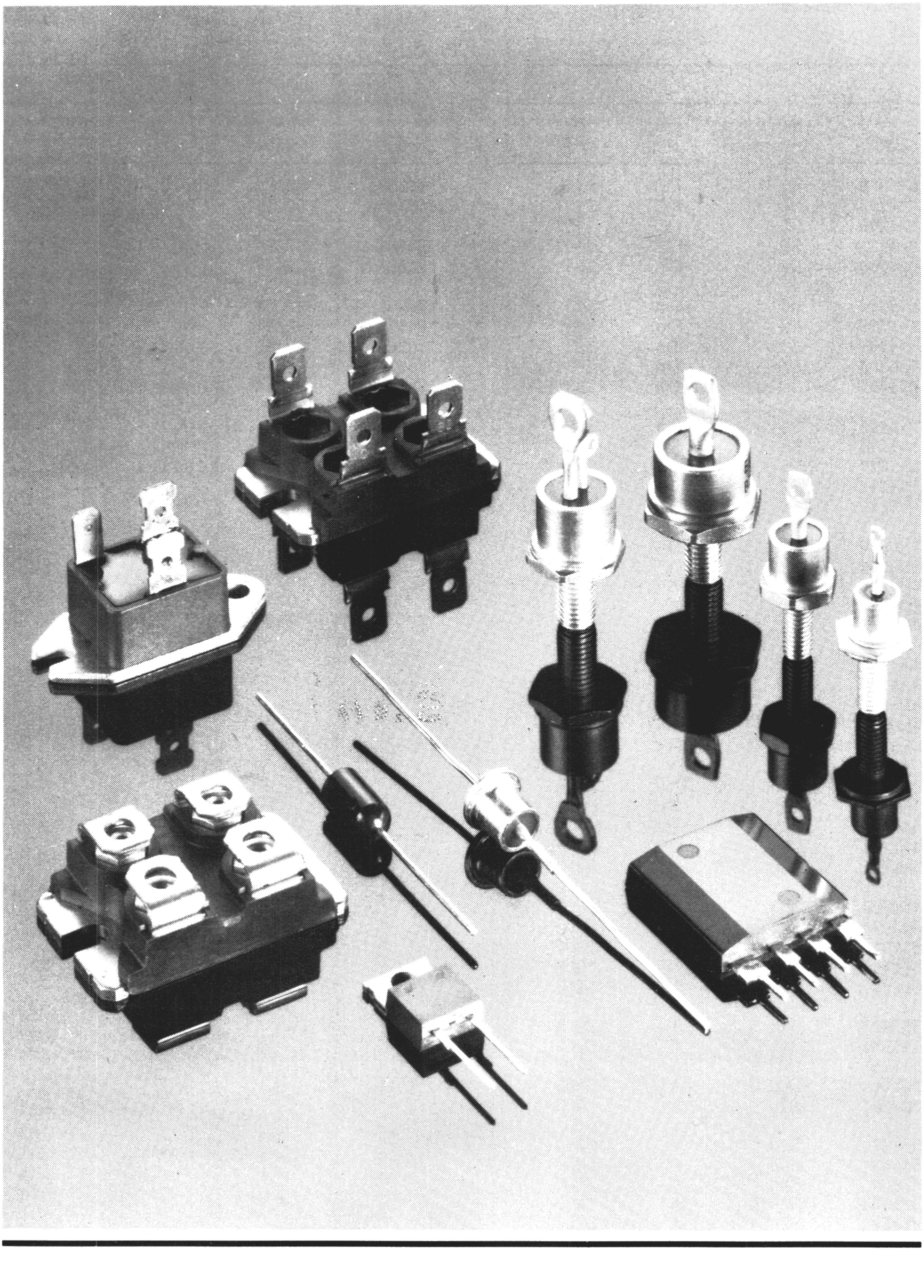
type	handbook reference	prod. code	cat. page
2N4858	S5	FET	S103
2N4859	S5	FET	S103
2N4860	S5	FET	S103
2N4861	S5	FET	S103
2N5086	S3	Sm	S33
2N5087	S3	Sm	S33
2N5088	S3	Sm	S33
2N5089	S3	Sm	S33
2N5400	S3	Sm	S33/39
2N5401	S3	Sm	S33/39
2N5415	S3	Sm	S39
2N5416	S3	Sm	S39
2N5550	S3	Sm	S33/39
2N5551	S3	Sm	S33/39
2N6659	S5	FET	S105
2N6660	S5	FET	S105
2N6661	S5	FET	S105
4N25A	S8b	PhC	S174
4N26	S8b	PhC	S174
4N27	S8b	PhC	S174
4N28	S8b	PhC	S174
4N29	S8b	PhC	S176
4N30	S8b	PhC	S176
4N31	S8b	PhC	S176
4N32	S8b	PhC	S176
4N33	S8b	PhC	S176
4N35	S8b	PhC	S174
4N36	S8b	PhC	S174
4N37	S8b	PhC	S174
4N38	S8b	PhC	S175
4N38A	S8b	PhC	S175
56201d	S4b	A	S203
56201j	S4b	A	S203
56245	S3/S10	A	S203
56246	S3/S10	A	S203
56261a	S4b	A	S203
56264a;b	S2a/b	A	S203
56295*	S2a/b	A	S203
56326	S4b	A	S203
56339	S4b	A	S203
56352	S4b	A	S203
56353	S4b	A	S203
56354	S4b	A	S203
56359b	S2/S4	A	S203
56359c	S2/S4	A	S203
56359d	S2/S4	A	S203
56360a	S2/S4	A	S203
56363	S2/S4	A	S203
56364	S2/S4	A	S203
56367	S2/S4	A	S203
56368a	S2/S4	A	S203
56368b	S2/S4	A	S203
56369	S2/S4	A	S203
56378	S2/S4	A	S203
56379	S2/S4	A	S203
56387a,b	S4b	A	S203
6N135	S8b	PhC	S179
6N136	S8b	PhC	S179

* series



PHILIPS

General purpose and high speed switching diodes

For detailed information on these and other types see Data Handbook S1

- robust diodes in a hermetic encapsulation
- fast switching and low, stable leakage current
- CECC–approved types available
- titanium–silver crystal metallization for a reliable electrical connection between crystal and dumet studs
- thermally–matched crystal, studs and glass encapsulation for constant contact pressure over a wide temperature range.
- reliable: 10 FITs (Failures In Time Standard) i.e. a failure rate of 10 x 10^{-9}/h at $T_j < 100$ °C

type	status	case	V_R V	I_F mA	t_{rr} ns	C_d pF	at V_R V	and f MHz	V_F V	at I_F mA
BA316	P	DO–35	10	100	4	2	0	1	1.1	100
BA220	P	DO–35	10	200	4	2.5	0	1	0.95	100
BAX14	P	DO–35	20	500	50	35	0	1	1	300
BA317	P	DO–35	30	100	4	2	0	1	1.1	100
BA221	C	DO–35	30	200	4	2.5	0	1	1.05	200
BAS15	P	DO–34	50	100	4	2	0	1	1.1	100
BA318	P	DO–35	50	100	4	2	0	1	1.1	100
1N4151	C	DO–35	50	200	4	2	0	1	1	50
1N4150	P	DO–35	50	300	6	2.5	0	1	1	200
BAV18	P	DO–35	50	250	50	5	0	1	1.25	200
1N4153	C	DO–35	50	200	4	2	0	1	0.88	20
BAV10	P	DO–35	60	300	6	2.5	0	1	1.25	500
BAX18	P	DO–35	75	500	50	35	0	1	1.5	300
BAW62	P	DO–35	75	200	4	2	0	1	1	100
1N4532	P	DO–34	75	200	2	2	0	1	1	10
1N4531	P	DO–34	75	200	4	4	0	1	1	10
1N4448	P	DO–35	75	200	4	4	0	1	1	100
1N4446	C	DO–35	75	200	4	4	0	1	1	20
1N4148	P	DO–35	75	200	4	4	0	1	1	10
1N916	C	DO–35	75	75	4	2	0	1	1	10
1N914	C	DO–35	75	75	4	4	0	1	1	10
BAX12*	P	DO–35	90	400	50	35	0	1	1.25	400
BAV19	P	DO–35	100	250	50	5	0	1	1.25	200
BAV20	P	DO–35	150	250	50	5	0	1	1.25	200
BAV21	P	DO–35	200	250	50	5	0	1	1.25	200
BAS11*	P	DO–35	300	350	1000	10	0	1	1.1	300

* avalanche type

N.B. All values are maximum ones unless stated otherwise

Schottky–Barrier switching and low–leakage diodes

For detailed information on these and other types see Data Handbook S1

- Schottky–Barrier diodes in hermetically sealed encapsulation
- Axial leaded miniature DO–34 housing
- BAT85 features a low V_F
- The low V_F of BAT81–83 allows very fast switching

Schottky–barrier switching diodes

type	status	case	V_R V	I_F mA	t_{rr} ns	C_d pF	at V_R V	and f MHz	V_F V	at I_F mA
BAT85	P	DO–34	30	200	5	10	1	1	0.32	1
BAT81	P	DO–34	40	30	1	1.6	1	1	0.41	1
BAT82	P	DO–34	50	30	1	1.6	1	1	0.41	1
BAT86	P	DO–34	50	200	4	8	1	1	0.38	1
BAT83	P	DO–34	60	30	1	1.6	1	1	0.41	1

Low–leakage diodes

type	status	case	V_R V	I_R* pF	at V_R V	C_d pF	at V_R V	and f MHz
BAS45	P	DO–34	125	1000	125	8	0	1
BAV45	C	TO–18	20	5	5	1.3	0	1

* $T_j = 25°C$

N.B. All values are maximum ones unless stated otherwise.

General data
Variable capacitance diodes

For detailed information on these and other types see Data Handbook S1

- tuning–voltage/capacitance characteristics gives a minimum non–linear distortion
- low leakage current
- low easily–compensated temperature coefficient of capacitance
- low series resistance to prevent damping of tuned circuits
- matched sets available
- available on tape or in bulk

type	status	case	r_s max Ω	C_d min pF	C_d max pF	at V_R V	C_d ratio min	C_d ratio max	over tuning voltage range V_1 to V	V_2 V
BB417	C	DO–34	1.2	2.2	2.4	15	2	5	4	15
BB119	P	DO–35	1.5	15.3	19	10	1.3		4	10
BB204B*	P	TO–92	0.4		15	30	2.5	2.8	3	30
BB112**	C	SOD–69	1.5	17	29	8.5	18		1	8.5
BB130	C	SOD–69	2	12	21	28	23		1	28
BB212*	C	TO–92	2.5		22	8	22.5		0.5	8
BB809**	P	DO–34	0.8	4	5	28	8	10	1	28
BB909A**	P	DO–34	0.9	2.6	3	28	12	15	1	28
BB909B**	P	DO–34	0.9	2.8	3.2	28	12	15	1	28
BB405B**	P	DO–34	0.75	1.8	2.2	28	7.6		1	28

* double diode
** available in matched sets
N.B. All values are maximum ones unless stated otherwise

Band switching diodes

For detailed information on these and other types see Data Handbook S1

Band switching diodes

type	status	case	V_R V	I_F mA	C_d pF	at V_R V	and f MHz	r_D Ω	at I_F mA	and f MHz
BA223	P	DO–34	20	50	3.5	6	1	1.5	10	1
BA423	P	DO–34	20	50	2.5	3	1	1.2	10	1
BA482	P	DO–34	35	100	1.2	3	100	0.7	3	200
BA483	P	DO–34	35	100	1	3	100	1.2	3	200
BA484	P	DO–34	35	100	1.6	3	100	1.2	3	200

UHF mixer Schottky–Barrier diodes

type	status	case	V_R V	I_F mA	C_d pF	at V_R V	and f MHz	V_F mV	at I_F mA
BA480	C	DO–34	4	30	1.2	0.2	1	280	1
BA481	C	DO–34	4	30	1.1	0.2	1	450	1

FM detection diode

type	status	case	V_R V	I_F mA	C_d pF	at V_R V	and f MHz	V_F min V	V_F max mV	at I_F μA
BA281	C	DO–35	50	200	1.2	0	1	360	420	10

N.B. All values are maximum ones unless stated otherwise

Voltage reference diodes; stabistors

For detailed information on these and other types see Data Handbook S1

- Full range of temperature compensated voltage reference diodes, stabistors and voltage regulator diodes.

Voltage reference diodes

type	status	case	V_{ref} nom. V	at I_Z mA	$\lvert S_Z \rvert$ %/K	r_{diff} Ω	at I_Z mA
BZV10	C	DO–34	6.5	2	0.01	50	2
BZV11	C	DO–34	6.5	2	0.005	50	2
BZV12	C	DO–34	6.5	2	0.002	50	2
BZV13	C	DO–34	6.5	2	0.001	50	2
BZV14	–	DO–34	6.5	2	0.0005	50	2
1N821	C	DO–34	6.2	7.5	0.01	15	7.5
1N823	C	DO–34	6.2	7.5	0.005	15	7.5
1N825	C	DO–34	6.2	7.5	0.002	15	7.5
1N827	C	DO–34	6.2	7.5	0.001	15	7.5
1N829	–	DO–34	6.2	7.5	0.0005	15	7.5

Stabistors

type	status	case	typical V_F (V) at:			V_R V_{RRM} V	I_{FRM} mA	S_F at I_F = 1 mA mV/K	r_{diff} at I_F = 10 mA Ω
			I_F = 1 mA	I_F = 5 mA	I_F = 10 mA				
BAX14	P	DO–35	0.55	0.62	0.65	40	2000	−2.2	6
BA220	C	DO–35	0.58	0.66	0.70	10	400	−2.2	7
BA315	P	DO–35	0.62	0.70	0.75	5	225	−2.1	7
BA314	P	DO–35	0.72	0.77	0.79	4	250	−1.8	6
BZV46–1V5	P	DO–35	1.35	1.45	1.50	4	120	−3.6*	20*
BZV46–2VO	P	DO–35	2.00	2.15	2.20	4	80	−5.6*	30*

* at I_F = 5 mA

N.B. All values are maximum ones unless stated otherwise.

Voltage regulator/transient suppressor diodes

For detailed information see Data Handbooks S1 and S2

Voltage regulator diodes

P_{tot} W at	T_{tp} °C	status	type	working voltage E24 series V	tolerance	P_{RSM} at T_j = 25 °C t_p = 100 µs square W	case
0.4	50	P	**BZV37**	6.5	5%	40	DO–34
0.5	50	C	**BZX55 series**	2.4 to 75	5%	40	DO–35
0.5	50	P	**BZX79 series**	2.4 to 75	5%	40	DO–35
0.5	50	C	**BZX79 series**	2.4 to 75	2%	40	DO–35
0.5	75	P	**PMLL5225B to PMLL5267B**	3.0 to 75	5%	–	SOD–80
0.5	75	P	**1N5225B to 1N5267B**	3.0 to 75	5%	–	DO–35
1.3	55	P	**BZV85 series**	3.6 to 75	5%	60	DO–41
2.5	105	P	**BZD27 series**	7V5 to 270	5%	300	SOD–87
2.5	25	P	**BZD23 series**	7V5 to 270	5%	300	SOD–81
3.25	25	P	**BZT03 series**	7.5 to 500	5%	600	SOD–57
6	25	P	**BZW03 series**	7.5 to 500	5%	1000	SOD–64

Transient suppressor diodes

type	status	V_R (stand–off voltage) V	$V_{(CL)R}$ V at	I_{RSM} A	P_{RSM} W	case
BZW14	C	12	28	50*	–	SOD–64
BZT03 series	P	6.2 to 220	11.3 to 380	26.5 to 0.8**	300**	SOD–57
BZW03 series	P	6.2 to 220	11.3 to 380	44.2 to 1.3**	500**	SOD–64

* 6/320 m/s exponential; T_{amb} = 25–85°C

** pulse according to IEC60–2, section 6: 10/1000 m/s T_j = 25°C prior to the pulse

For detailed information on these and other types see Data Handbook S1 and S2

Schottky–Barrier

$I_{F\ (AV)\ max}$ A	$V_{RRM\ (max)}$ (V) 35	40	45
2 x 5	**BYV117–35**	**BYV117–40**	**BYV117–45**
2 x 10	**BYV133–35**	**BYV133–40**	**BYV133–45**
15	**BYV120–35**	**BYV120–40**	**BYV120–45**
2 x 15	**BYV143–35**	**BYV143–40**	**BYV143–45**
30	**BYV121–35**	**BYV121–40**	**BYV121–45**

Ultra fast and very fast recovery types

For detailed information on these and other types see Data Handbooks S1 and S2

$I_{F\,(AV)\,max}$ A	type	$V_{RRM\,(max)}$ (V) 50	100	150	200	250	300	400	450	500	600	700	800	1000
Ultra fast														
1	**BYV26**				●			●			●		●	●
1.25	**BYD73***	●	●	●	●	●	●	●						
1.6	**BYV36**				●			●			●		●	●
2	**BYD77***	●	●	●	●	●	●	●						
2	**BYV27***	●	●	●	●									
2.3	**BYM26**				●			●			●		●	●
2.4	**BYD74***	●	●	●	●	●	●	●						
3	**BYM36**				●			●			●		●	●
3.5	**BYV28***	●	●	●	●									
2 x 5	**BYQ28****	●	●	●	●									
2 x 5	**BYT28****						●	●		●				
2 x 5	**BYP20****	●	●	●	●									
7	**BYX50**				●		●							
7.5	**BYR29**									●	●	●	●	
8	**BYP21**	●	●	●	●									
9	**BYV29**						●	●	●	●				
9	**BYW29**	●	●	●	●									
2 x 10	**BYV32****	●	●	●	●									
2 x 10	**BYV34****						●	●	●	●				
2 x 10	**BYP22****	●	●	●	●									
14	**BYV30**						●	●	●	●				
14	**BYW30**	●	●	●	●									
14	**BYT79**						●	●	●	●				
14	**BYV79**	●	●	●	●									
2 x 15	**BYV42****	●	●	●	●									
2 x 15	**BYV44****						●	●	●	●				
2 x 15	**BYV72****	●	●	●	●									
2 x 15	**BYV74****						●	●	●	●				
28	**BYV31**						●	●	●	●				
28	**BYW31**	●	●	●	●						●			
2 x 30	**BYT230PI(V)****				●		●	●		●		●		
40	**BYV92**						●	●	●	●				
40	**BYW92**	●	●	●	●									
2 x 50	**BYV54(V)****	●	●	●	●									
60	**BYW93**	●	●	●	●									

Very fast types		50	100	150	200	300	400	500	600	800	1000	1200	1300	1500
1.3	**BYD33**				●		●		●	●	●			
1.5	**BYD37**				●		●		●	●	●			
1.5	**BYV95**				●		●		●					
1.5	**BYV96**									●	●			
3	**BYW95**				●		●		●					
3	**BYW96**									●	●			
6	**1N3879/83**	●	●		●	●	●							
12	**1N3889/92**	●	●		●	●								
14	**BYX30**				●	●	●	●	●					
22	**BYX46**				●	●	●	●	●					
30	**1N3909/13**	●	●		●	●	●							
0.5	**BYD31**				●		●		●					
1.8	**BYD34**				●		●		●	●	●			
1.5	**1N4933/37**	●	●		●		●		●					

* epitaxial type
** monolithic dual rectifier diodes

PHILIPS

Fast general purpose and efficiency types

For detailed information on these and other types see Data Handbooks S1 and S2

Fast types

$I_{F(AV)\,max}$ A	type	$V_{RRM\,(max)}$(V) 50	100	150	200	300	400	500	600	800	1000	1200	1300	1500
6.5	**BY359**										●		●	●
7	**BY229**				●		●		●	●				
8	**BY329**									●	●	●		
12	**BYV24**									●	●			

General purpose types

$I_{F(AV)\,max}$ A	type	$V_{RRM\,(max)}/V_{RWM\,(MAX)}$ (V) 50	100	150	200	300	400	500	600	800	1000	1200	1250	1400	1600
0.6	**BYD11***				●		●		●	●	●				
1	**1N4001ID**	●	●		●		●		●	●	●				
1	**1N4007ID**	●	●		●		●		●	●	●				
1.4	**BYD13***				●		●		●	●	●				
1.5	**BYD17***				●		●		●	●	●				
2	**BYD14***				●		●		●	●	●				
2	**BY527***												●		
2	**BY627***												●		
2	**BYW54***								●						
2	**BYW55***									●					
2	**BYW56***										●				
2	**1N5059***				●										
2	**1N5060***						●								
2	**1N5061***								●						
2	**1N5062***									●					
3.5	**BYM56***				●		●		●	●	●				
6	**BYX38**					●			●			●			
6.5	**BY249**					●			●						
9.5	**BYX39***								●	●	●	●		●	
10	**BYX98**					●			●			●			
12	**BYX42**					●			●			●			
15	**BYX99**					●			●			●			
20	**BYX25***								●	●	●	●		●	
30	**BYX96**					●			●			●			●
48	**BYX52**					●			●			●			
48	**BYX56***								●	●	●	●		●	
50	**BYX97**					●			●			●			●

Efficiency diodes

$I_{FW\,max}$ A	type	$V_{RRM\,(max)}$ (V) 50	1200	1400	1500	1600
4	**BY448**				●	
4	**BY458**		●			
5	**BY228**				●	
5	**BY438**		●			
5	**BY328****			●		
–	**BY588**	●				
–	**BYX10G**					●

* controlled avalanche type
** for 32 kHz scanning systems

High voltage types

For detailed information on these and other types see Data Handbooks S1 and S2

E.H.T. rectifiers
(see page S24)

$I_{F(AV)}$ max mA		V_{RRM} (kv)														
		1.8	2.2	5	6	7.5	10	12	12.5	14	15	17	19	22	24	30
550	**BYX90G***					●										
85	**BY584**	●														
85	**BY505**		●													
50	**BY614**		●													
4	**BY509**										●					
4	**BY609***										●					
4	**BY610***											●				
4	**BY619***										●					
4	**BY620***											●				
20	**BY705**			●												
20	**BY706**				●											
4	**BY707**						●									
4	**BY708**							●								
4	**BY709**									●						
3	**BY710**															
3	**BY711**												●			
3	**BY712**													●		
3	**BY713**														●	
3	**BY714**															●
20	**BY715****			●												
20	**BY716****				●											
4	**BY717****						●									
4	**BY718****							●								
4	**BY719****									●						
3	**BY720****															
3	**BY721****												●			
3	**BY722****													●		
3	**BY723****														●	
3	**BY724****															●

* with avalanche characteristics
** meant for ⩾ 32 kHz TV scanning sytems

Voltage tripler units
(See page S24)

E.H.T. output: 1.7 mA; 27.5 kV
BG2000–641
BG2097–641/642

For detailed information on these and other types see Data Handbooks S1 and S2

type		status	case	ratings				characteristics	
				$I_{F(AV)}$ max A	V_{RRM} max V	I_{FSM} and I^2t $T_{j\,max}$; t = 10 ms A	A^{2}s	C_d typ pF	$V_{F\,max}$ at I_F T_j = 100 °C V/A
BYV117	**–35** **–40** **–45**	P	SOT–82	8.5	35 40 45	100	50	200	0.6/5
BYV133	**–35** **–40** **–45**	P	TO–220AB	28	35 40 45	200	200	300	0.6/7*
BYV120	**–35** **–40** **–45**	P	DO–4	15	35 40 45	300	450	520	0.6/15*
BYV143	**–35** **–40** **–45**	P	TO–220AB	40	35 40 45	200	200	500	0.6/7*
BYV121	**–35** **–40** **–45**	P	DO–4	30	35 40 45	600	1800	1150	0.6/34*

* T_j = 150 °C

Ultra fast (epitaxial) types

For detailed information on these and other types see Data Handbooks S1 and S2

type	status	case	ratings				characteristics		
			$I_{F\,(AV)}$ A	V_{RRM} V	I_{FRM} A	I_{FSM} $T_{j\,max}$; $t = 10$ ms A	t_{rr} max ns	$V_{F\,max}$ at I_F $T_j = 25$ °C V/A	I_{RRM} A
BYV26 –A	P	SOD–57	1	200	10	30	30	2.5/1	
–B				400			30		
–C				600			30		
–D				800			75		
–E				1000			75		
BYD73 –A*	P	SOD–81	1.75	50	15	25	25	0.95/1	
–B				100					
–C				150					
–D				200					
–E	P	SOD–81	1.7	250	13	25	50	1.05/1	
–F				300					
–G				400					
BYV36 –A	P	SOD–57	1.6	200	10	30	100	1.35/1	
–B			1.6	400			100	1.35/1	
–C			1.6	600			100	1.35/1	
–D			1.5	800	9		150	1.45/1	
–E			1.5	1000	9		150	1.45/1	
BYV27 – 50*	P	SOD–57	2	50	15	50	25	1.07/3	
– 100				100					
– 150				150					
– 200				200					
BYD77 –A*	P	SOD–87	2	50	15	25	25	0.95/1	
–B			2	100					
–C			2	150					
–D			2	200					
–E			1.85	250	13		50	1.05/1	
–F			1.85	300					
–G			1.85	400					
BYM26 –A	P	SOD–64	2.3	200	8	45	30	2.65/2	
–B			2.3	400					
–C			2.3	600					
–D			2.3	800			75		
–E			2.3	1000			75		
BYD74 –A*	P	SOD–84	2.4	50	21	50	25	0.94/2	
–B			2.4	100			25	0.94/2	
–C			2.4	150			25	0.94/2	
–D			2.4	200			25	0.94/2	
–E			2.15	250			50	1.05/2	
–F			2.15	300			50	1.05/2	
–G			2.15	400			50	1.05/2	

* epitaxial type

data section continues next page

For detailed information on these and other types see Data Handbooks S1 and S2

			ratings				characteristics		
type	status	case	$I_{F\,(AV)}$ A	V_{RRM} V	I_{FRM} A	I_{FSM} $T_{j\,max}$; $t = 10$ ms A	t_{rr} max ns	$V_{F\,max}$ at I_F $T_j = 25$ °C V/A	I_{RRM} A
BYM36 –A	P	SOD–64	3	200	13	65	100	1.6/3	
–B			3	400					
–C			3	600					
–D			2.9	800	11		150	1.78/3	
–E			2.9	1000	11		150	1.78/3	
BYV28 – 50*	P	SOD–64	3.5	50	25	90	30	1.1/5	
– 100				100					
– 150				150					
– 200				200					
BYQ28 – 50	P	TO–220AB(3)	2 x 5	50	80	50	20	0.85/5	1.2
double – 100				100					
– 150				150					
– 200				200					

* epitaxial type

data section continues next page

For detailed information on these and other types see Data Handbook S1 and S2

			ratings						characteristics		
type	status	case	$I_{F\,(AV)}$ A	V_{RRM} V	V_{RWM} V	I_{FRM} A	I_{FSM} and I^2t $T_{j\,max}$; $t = 10$ ms A	A^2s	t_{rr} max ns	$V_{F\,max}$ at I_F $T_j = 25$ °C V/A	I_{RRM} A
BYT28 – 300	P	TO–220AB	2 x 5	300	300	80	50	12.5	50	1.05/5	3.0
double – 400				400	300						
– 450				450							
– 500				500	400						
BYR29 – 500	P	TO–220AC	8	500	400	130	60	18	75	1.3/10	6.0
– 600				600	500						
– 700				700							
– 800				800	600						
BYV29 – 300	P	TO–220AC	9	300	200	100	80	50	50	1.05/5	–
– 400				400	300						
– 500				500	400						
BYW29 – 50	P	TO–220AC	8	50	50	240	80	32	25	0.8/8	4.0
– 100				100	100						
– 150				150	150						
– 200				200	200						
BYV32 – 50	P	TO–220AB	2 x 10	50	50	300	150	112	25	0.85/5	2.0
double – 100				100	100						
– 150				150	150						
– 200				200	200						
BYV34 – 300	P	TO–220AB	2 x 10	300	200	240	120	12	50	0.93/10	5.0
double – 400				400	300						
– 450				450							
– 500				500	400						
BYV30 – 300	C	DO–4(1)	14	300	200	320	150	112	50	1.05/15	–
– 400		unified		400	300						
– 450		stud		450							
– 500				500	400						
BYW30 – 50	P	DO–4(1)	14	50	50	420	200	200	30	0.8/15	4.0
– 100		metric		100	100						
– 150		stud*		150	150						
– 200				200	200						
BYT79 – 300	P	TO–220AC	14	300	200	320	150	112	50	1.05/15	5.2
– 400				400	300						
– 450				450							
– 500				500	400						
BYV79 – 50	P	TO–220AC	14	50	50	420	180	160	30	0.85/10	4.0
– 100				100	100						
– 150				150	150						
– 200				200	200						

* unified stud available, add suffix **U**
(e.g. **BYW30–50U**)
data section continues next page

SOT–220 and SOT–93 versions are also available in F–pack versions

Ultra fast (epitaxial) types (cont.)

For detailed information on these and other types see Data Handbook S1 and S2

type		status	case	ratings						characteristics		
				$I_{F\ (AV)}$ A	V_{RRM} V	V_{RWM} V	I_{FRM} A	I_{FSM} and I^2t $T_{j\ max}$; t = 10 ms A	 A^2s	t_{rr} max ns	$V_{F\ max}$ at I_F T_j = 25 °C V/A	I_{RRM} A
BYV42	**– 50**	P	TO–220AB(3)	2 x 15	50	50	400	200	–	35	0.85/10	2.4
double	**– 100**				100	100						
	– 150				150	150						
	– 200				200	200						
BYV44	**– 300**	P	TO–220AB	2 x 15	300	200	320	150	112	50	1.05/15	5.2
double	**– 400**				400	300						
	– 450				450							
	– 500				500	400						
BYV72	**– 50**	P	SOT–93	2 x 15	50	50	320	150	112	28	0.85/10	2.4
double	**– 100**				100	100						
	– 150				150	150						
	– 200				200	200						
BYV74	**– 300**	P	SOT–93	2 x 15	300	200	320	130	84	50	1.05/15	5.2
double	**– 400**				400	300						
	– 450				450							
	– 500				500	400						
BYV31	**– 300**	C	DO–4(2) metric stud*	28	300	200	550	300	450	50	1.05/30	4.0
	– 400				400	300						
	– 450				450	400						
	– 500				500	400						
BYW31	**– 50**	C	DO–4(2) metric stud*	28	50	50	550	320	500	40	0.8/30	4.0
	– 100				100	100						
	– 150				150	150						
	– 200				200	200						
BYV92	**– 300**	C	DO–5 unified stud	40	300	–	–	500	–	100	1.4/100	–
	– 400				400							
	– 450				450							
	– 500				500							
BYW92	**– 50**	C	DO–5 metric stud*	40	50	50	800	500	1250	40	0.8/35	4.5
	– 100				100	100						
	– 150				150	150						
	– 200				200	200						
BYW93	**– 50**	C	DO–5 metric stud*	60	50	50	1500	800	3200	45	0.8/50	6.0
	– 100				100	100						
	– 150				150	150						
	– 200				200	200						
	– 200V				200	200						

* unified stud available, add suffix **U** (e.g. **BYV31–50U**)

Ultra fast (epitaxial) types (cont.)

For detailed information on these and other types see Data Handbook S1 and S2

			ratings						characteristics			
type	st.	case	$I_{F(AV)}$ A	V_{RRM} V	V_{RWM} V	I_{FRM} A	I_{FSM} and I^2t $T_{j\,max}$; t = 10 ms A	A²s	t_{rr} max ns	V_F max T_j = 25 °C V	at I_F A	I_{RRM} A
BYP21–50	P	TO–220AC	8	50	50	175	80	32	25	1.045	8	2
BYP21–100	P	TO–220AC	8	100	100	175	80	32	25	1.045	8	2
BYP21–150	P	TO–220AC	8	150	150	175	80	32	25	1.045	8	2
BYP21–200	P	TO–220AC	8	200	200	175	80	32	25	1.045	8	2
BYP22–50	P	TO–220AB		50	50	230	140	98	25	0.975	8	2
BYP22–100	P	TO–220AB		100	100	230	140	98	25	0.975	8	2
BYP22–150	P	TO–220AB		150	150	230	140	98	25	0.975	8	2
BYP22–200	P	TO–220AB		200	200	230	140	98	25	0.975	8	2
BYT230PIV–200	P	SOT–227B	30	200		800	500	610	50	1.5	30	
BYT230PIV–300	P	SOT–227B	30	300		800	500	610	50	1.5	30	
BYT230PIV–400	P	SOT–227B	30	400		800	500	610	50	1.5	30	
BYT230PIV–600	P	SOT–227B	30	600		375	200	200	55	1.9	30	
BYT230PIV–700	P	SOT–227B	30	700		375	200	200	55	1.9	30	
BYT230PIV–800	P	SOT–227B	30	800		375	200	200	55	1.9	30	
BYT230PIV–1000	P	SOT–227B	30	1000		375	200	200	70	1.9	30	
BYV54V–50	P	SOT–227B	100	50		1000	1000	3200	60	0.8	50	
BYV54V–100	P	SOT–227B	100	100		1000	1000	3200	60	0.8	50	
BYV54V–150	P	SOT–227B	100	150		1000	1000	3200	60	0.8	50	
BYV54V–200	P	SOT–227B	100	200		1000	1000	3200	60	0.8	50	

General data
Very fast types

For detailed information on these and other types see Data Handbooks S1 and S2

			ratings						characteristics		
type	st.	case	$I_{F(AV)}$ A	V_{RRM} V	V_{RWM} V	I_{FRM} A	I_{FSM} and I^2t T_j max; t = 10 ms A	A²s	t_{rr} max ns	V_F max T_j = 25 °C V	at I_F A
BYD31–D*	P	SOD–91	0.5	200			10		250	1.6	1
BYD31–G*	P	SOD–91	0.5	400			10		250	1.6	1
BYD31–J*	P	SOD–91	0.5	600			10		250	1.6	1
BYD33–D*	P	SOD–81	1.3	200		7	20		250	1.3	1
BYD33–G*	P	SOD–81	1.3	400		7	20		250	1.3	1
BYD33–J*	P	SOD–81	1.3	600		7	20		250	1.3	1
BYD33–K*	P	SOD–81	1.3	800		7	20		300	1.3	1
BYD33–M*	P	SOD–81	1.3	1000		7	20		300	1.3	1
BYD34–D*	P	SOD–84	1.8	200		17	45		250	1.4	3
BYD34–G*	P	SOD–84	1.8	400		17	45		250	1.4	3
BYD34–J*	P	SOD–84	1.8	600		17	45		250	1.4	3
BYD34–K*	P	SOD–84	1.8	800		17	35		300	1.4	3
BYD34–M*	P	SOD–84	1.8	1000		17	35		300	1.4	3
BYD37–D*	P	SOD–87	1.5	200		12	20		250	1.3	1
BYD37–G*	P	SOD–87	1.5	400		12	20		250	1.3	1
BYD37–J*	P	SOD–87	1.5	600		12	20		250	1.3	1
BYD37–K*	P	SOD–87	1.5	800		12	20		300	1.3	1
BYD37–M*	P	SOD–87	1.5	1000		12	20		300	1.3	1
BYV95A*	P	SOD–57	1.5	200		10	35		250	1.6	3
BYV95B*	P	SOD–57	1.5	400		10	35		250	1.6	3
BYV95C*	P	SOD–57	1.5	600		10	35		250	1.6	3
BYV96–D*	P	SOD–57	1.5	800		10	35		300	1.6	3
BYV96–E*	P	SOD–57	1.5	1000		10	35		300	1.6	3
BYW95A	P	SOD–64	3	200		15	70		250	1.5	5
BYW95B	P	SOD–64	3	400		15	70		250	1.5	5
BYW95C	P	SOD–64	3	600		15	70		250	1.5	5
BYW96D	P	SOD–64	3	800		15	70		300	1.5	5
BYW96E	P	SOD–64	3	1000		15	70		300	1.5	5
BYX50–200	C	DO–4(1)	7	200	200	80	80	32	100	1.95	20
BYX50–300	C	DO–4(1)	7	300	300	80	80	32	100	1.95	20
1N3879	C	DO–4(1)	6	50	50	75	75	28	200	1.4	6
1N3880	C	DO–4(1)	6	100	100	75	75	28	200	1.4	6
1N3881	C	DO–4(1)	6	200	200	75	75	28	200	1.4	6
1N3882	C	DO–4(1)	6	300	300	75	75	28	200	1.4	6
1N3883	C	DO–4(1)	6	400	400	75	75	28	200	1.4	6
1N3889	C	DO–4(1)	12	50	50	140	140	100	200	1.4	12
1N3890	C	DO–4(1)	12	100	100	140	140	100	200	1.4	12
1N3891	C	DO–4(1)	12	200	200	140	140	100	200	1.4	12
1N3892	C	DO–4(1)	12	300	300	140	140	100	200	1.4	12
1N3893	C	DO–4(1)	12	400	400	140	140	100	200	1.4	12
1N4933	P	SOD–84	1.5	50			30		200	1.1	1
1N4934	P	SOD–84	1.5	100			30		200	1.1	1
1N4935	P	SOD–84	1.5	200			30		200	1.1	1
1N4936	P	SOD–84	1.5	400			30		200	1.1	1
1N4937	P	SOD–84	1.5	600			30		200	1.1	1

* avalanche types

PHILIPS

Very fast types

For detailed information on these and other types see Data Handbooks S1 and S2

			ratings						characteristics		
type	st.	case	$I_{F(AV)}$ A	V_{RRM} V	V_{RWM} V	I_{FRM} A	I_{FSM} and I^2t T_j max; $t = 10$ ms A	A^2s	t_{rr} max ns	V_F max $T_j = 25$ °C V	at I_F A
BYX30–200*	C	DO–4(1)	14		200	310	250	312	200	3.2	50
BYX30–200R*	C	DO–4(1)	14		200	310	250	312	200	3.2	50
BYX30–300*	C	DO–4(1)	14		300	310	250	312	200	3.2	50
BYX30–300R*	C	DO–4(1)	14		300	310	250	312	200	3.2	50
BYX30–400*	C	DO–4(1)	14		400	310	250	312	200	3.2	50
BYX30–400R*	C	DO–4(1)	14		400	310	250	312	200	3.2	50
BYX30–500*	C	DO–4(1)	14		500	310	250	312	200	3.2	50
BYX30–500R*	C	DO–4(1)	14		500	310	250	312	200	3.2	50
BYX30–600*	C	DO–4(1)	14		600	310	250	312	200	3.2	50
BYX30–600R*	C	DO–4(1)	14		600	310	250	312	200	3.2	50
BYX46–200*	C	DO–4(1)	22		200	400	300	450	200	2	50
BYX46–200R*	C	DO–4(1)	22		200	400	300	450	200	2	50
BYX46–300*	C	DO–4(1)	22		300	400	300	450	200	2	50
BYX46–300R*	C	DO–4(1)	22		300	400	300	450	200	2	50
BYX46–400*	C	DO–4(1)	22		400	400	300	450	200	2	50
BYX46–400R*	C	DO–4(1)	22		400	400	300	450	200	2	50
BYX46–500*	C	DO–4(1)	22		500	400	300	450	200	2	50
BYX46–500R*	C	DO–4(1)	22		500	400	300	450	200	2	50
BYX46–600*	C	DO–4(1)	22		600	400	300	450	200	2	50
BYX46–600R*	C	DO–4(1)	22		600	400	300	450	200	2	50
1N3909	C	DO–5(1)	30	50	50	125	275	375	200	1.4	30
1N3910	C	DO–5(1)	30	100	100	125	275	375	200	1.4	30
1N3911	C	DO–5(1)	30	200	200	125	275	375	200	1.4	30
1N3912	C	DO–5(1)	30	300	300	125	275	375	200	1.4	30
1N3913	C	DO–5(1)	30	400	400	125	275	375	200	1.4	30

* with avalanche characteristics

Fast types

For detailed information on these and other types see Handbooks S1 and S2

			ratings						characteristics		
type	st.	case	$I_{F(AV)}$ A	V_{RRM} V	V_{RWM} V	I_{FRM} A	I_{FSM} and I^2t T_j max; $t = 10$ ms A	A^2s	t_{rr} max ns	V_F max $T_j = 25$ °C V	at I_F A
BYV24–1000	C	DO–4(2)	12	1000	850	120	150	72	450	1.7	20
BYV24–1000R	C	DO–4(2)	12	1000	850	120	150	72	450	1.7	20
BYV24–800	C	DO–4(2)	12	800	650	120	150	72	450	1.7	20
BYV24–800R	C	DO–4(2)	12	800	650	120	150	72	450	1.7	20
BY229–200	P	TO–220AC	7	200	150	135	60	18	150	1.85	20
BY229–200R	P	TO–220AC	7	200	150	135	60	18	150	1.85	20
BY229–400	P	TO–220AC	7	400	300	135	60	18	150	1.85	20
BY229–400R	P	TO–220AC	7	400	300	135	60	18	150	1.85	20
BY229–600	P	TO–220AC	7	600	500	135	60	18	150	1.85	20
BY229–600R	P	TO–220AC	7	600	500	135	60	18	150	1.85	20
BY229–800	P	TO–220AC	7	800	600	135	60	18	150	1.85	20
BY229–800R	P	TO–220AC	7	800	600	135	60	18	150	1.85	20
BY229–1000	P	TO–220AC	7	1000	600	135	60	18	150	1.85	20
BY229–1000R	P	TO–220AC	7	1000	600	135	60	18	150	1.85	20
BY229F–200	P	SOT–186	7	200	150	135	60	18	150	1.85	20
BY229F–400	P	SOT–186	7	400	300	135	60	18	150	1.85	20
BY229F–600	P	SOT–186	7	600	500	135	60	18	150	1.85	20
BY229F–800	P	SOT–186	7	800	600	135	60	18	150	1.85	20
BY229F–1000	P	SOT–186	7	1000	600	135	60	18	150	1.85	20
BY329–800	P	TO–220AC	8	800	600	80	80	32	150	1.85	20
BY329–1000	P	TO–220AC	8	1000	800	80	80	32	150	1.85	20
BY329–1200	P	TO–220AC	8	1200	1000	80	80	32	150	1.85	20
BY359–1000	P	TO–220AC	6.5	1000	800	60	60		600	2.3	20
BY359–1300	P	TO–220AC	6.5	1300	1200	60	60		600	2.3	20
BY359–1500	P	TO–220AC	6.5	1500	1300	60	60		600	2.3	20

Controlled avalanche types (general purpose)

For detailed information on these and other types see Data Handbooks S1 and S2

				ratings							
type		status	case	$I_{F\,(AV)}$ A	V_{RRM} V	V_{RWM} V	I_{FRM} A	I_{FSM} $T_{j\,max}$; t = 10 ms A	P_{RRM} and P_{RSM} t = 20 µs kW	kW	E_{RSM} mJ
BYD11	**–D**	P	SOD–91	0.6		200		10			
	–G					400					
	–J					600					
	–K					800					
	–M					1000					
1N4001ID		P	SOD–81	1		50	10	20			
1N4002ID						100					
1N4003ID						200					
1N4004ID						400					
1N4005ID						600					
1N4006ID						800					
1N4007ID						1000					
BYD13	**–D**	P	SOD–81	1.4		200	5.5	20	–	–	7
	–G					400					
	–J					600					
	–K					800					
	–M					1000					
BYD17	**–D**	P	SOD–87	1.5		200	5.5	20	–	–	7
	–G					400					
	–J					600					
	–K					800					
	–M					1000					
BYD14	**–D**	P	SOD–84	2	–	200	20	50	–	–	40
	–G					400					
	–J					600					
	–K					800					
	–M					1000					
BYW54		P	SOD–57	2		600	12	50	–	1	20
BYW55						800					
BYW56						1000					
BY527		C	SOD–57	2	1250	800	12	50	–	–	20
BY627		P	SOD–84	2	1250	800	20	50			40
1N5059		P	SOD–57	2		200	12	50	–	1	20
1N5060						400					
1N5061						600					
1N5062						800					

The 1N4..... series are not avalanche types

Controlled avalanche types (general purpose)

For detailed information on these and other types see Data Handbooks S1 and S2

type		status	case	ratings							
				$I_{F(AV)}$ A	V_{RRM} V	V_{RWM} V	I_{FRM} A	I_{FSM} $T_{j\,max}$; $t = 10$ ms A	P_{RRM} and P_{RSM} $t = 20$ µs kW	kW	E_{RSM} mJ
BYM56	**–A**	P	SOD–64	3.5		200	20	80	–	1	20
	–B					400					
	–C					600					
	–D					800					
	–E					1000					
BYX39	**– 600(R)**	C	DO–4(1) unified stud	9.5		600	100	125	2*	4*	–
	– 800(R)					800					
	–1000(R)					1000					
	–1200(R)					1200					
	–1400(R)					1400					
BYX25	**– 600(R)**	C	DO–4(2) unified stud	20		600	440	360	3*	18*	–
	– 800(R)					800					
	–1000(R)					1000					
	–1200(R)					1200					
	–1400(R)					1400					
BYX56	**– 600(R)**	C	DO–5 unified stud	48		600	450	800	6,5*	40*	–
	– 800(R)					800					
	–1000(R)					1000					
	–1200(R)					1200					
	–1400(R)					1400					

* $t = 10$ µs

(**R**) Reverse polarity types available, add suffix **R** to type number (e.g. **BYX39–600R**)

General purpose types

For detailed information on these and other types see Data Handbooks S1 and S2

type		status	case	ratings					characteristics
				$I_{F\,(AV)}$ A	V_{RRM} V	I_{FRM} A	I_{FSM} and $T_{j\,max}$; t = 10 ms A	I^2t A^2s	$V_{F\,max}$ at I_F T_j = 25 °C V/A
BYX38	**– 300(R)** **– 600(R)** **–1200(R)**	C	DO–4(1) unified stud	6	300 600 1200	50	50	13	1.7/20
BY249	**– 300(R)** **– 600(R)**	P	TO–220AC	6.5	300 600	60	60	8	1.6/20
BYX98	**– 300(R)** **– 600(R)** **–1200(R)**	C	DO–4(1) unified stud	10	300 600 1200	75	75	28	1.7/20
BYX42	**– 300(R)** **– 600(R)** **–1200(R)**	C	DO–4(1) unified stud	12	300 600 1200	60	125	75	1.4/15
BYX99	**– 300(R)** **– 600(R)** **–1200(R)**	C	DO–4(1) unified stud	15	300 600 1200	180	180	162	1.55/50
BYX96	**– 300(R)** **– 600(R)** **–1200(R)** **–1600(R)**	C	DO–4(3) metric stud*	30	300 600 1200 1600	400	400	800	1.7/100
BYX52	**– 300(R)** **– 600(R)** **–1200(R)**	C	DO–5 unified stud	48	300 600 1200	450	800	3200	1.8/150
BYX97	**– 300(R)** **– 600(R)** **–1200(R)** **–1600(R)**	C	DO–5 metric stud	50	300 600 1200 1600	550	800	3200	1.45/150

* For unified stud, add final letter **U** (e.g. **BYX96–300RU**)
SOT–220 and SOT–93 versions are also available in F–pack versions

(**R**) Reverse polarity types available, add suffix **R** to type number (e.g. **BYX38–300R**)

Efficiency diodes

For detailed information on these and other types see Data Handbooks S1 and S2

Efficiency diodes

type	status	case	ratings			characteristics
			$I_{F(AV)}$* I_{FWM} A	V_{RRM} V	I_{FRM} A	t_{tot} max µs
BYX10G	P	SOD–57	1.2*	1600	5	–
BY588	P	SOD–57	1.5*	50	10	–
BY448	P	SOD–57	4	1500	8	20
BY458	P	SOD–57	4	1200	8	20
BY228	P	SOD–64	5	1500	10	20
BY438	P	SOD–64	5	1200	10	20
BY328	P	SOD–64	5	1400	6	13

* plastic module with heatsink face

For detailed information on these and other types see Data Handbooks S1 and S2

E.H.T. rectifiers

type	status	case	V_{RW} (kV)	V_{RRM} (kV)	$I_{F(AV)}$ (mA)	t_{rr} typ (µs)
BYX90G*	P	SOD–83	6	7.5	550	< 0.35
BY584	P	SOD–61	1.5	1.8	85	0.2
BY505	P	SOD–61	2	2.2	85	0.2
BY614	–	SOD–61	2	2.2	50	0.2
BY509	C	SOD–61	11.5	15	4	0.2
BY609*	P	SOD–61	12	15	4	0.2
BY610*	P	SOD–61	12	17	4	0.2
BY619*	P	SOD–61	12	15	4	0.2
BY620*	P	SOD–61	12	17	4	0.2
BY705	P	SOD–61	4	5	20	0.2
BY706	P	SOD–61	5	6	20	0.2
BY707	P	SOD–61	9	10	4	0.2
BY708	P	SOD–61	10	12	4	0.2
BY709	P	SOD–61	12	14	4	0.2
BY710	P	SOD–61	14	17	3	0.2
BY711	P	SOD–61	16	19	3	0.2
BY712	P	SOD–61	18	22	3	0.2
BY713	P	SOD–61	20	24	3	0.2
BY714	P	SOD–61	24	30	3	0.2
BY715	P	SOD–61	4	5	20	0.1
BY716	P	SOD–61	5	6	20	0.1
BY717	P	SOD–61	9	10	4	0.1
BY718	P	SOD–61	10	12	4	0.1
BY719	P	SOD–61	12	14	4	0.1
BY720	P	SOD–61	14	17	3	0.1
BY721	P	SOD–61	16	19	3	0.1
BY722	P	SOD–61	18	22	3	0.1
BY723	P	SOD–61	20	24	3	0.1
BY724	P	SOD–61	24	30	3	0.1

Voltage tripler units

type		status	case sizes in mm	T_{amb} max °C	ratings			
					input $V_{i(p-p)}$ kV	output $V_{O(EHT)}$ kV	$I_{O(EHT)}$ mA	$I_{O(FOC)}$ µA
BG2000	**– 641**	C	24 x 52 x 51	65	10	27.5	1.7	400
BG2097 **1)**	**– 641** **– 642** 2)	C	24 x 80 x 57	65	10	27.5	1.7	–

* avalanche types
1) with intergrated bleeder resistor
2) with focus potentiometer

General purpose thyristors, triacs and bi–directional devices

For detailed information see Data Handbook S2

General purpose thyristors (page S26)

$V_{RRM\ max}$ (V)

$I_{T(RMS)}$ A		50	100	150	200	400	500	600	800	1000	1200	1400	1600
0.8	**BT169**				●	●		●					
4	**BT148**					●	●	●					
4	**BT150**						●						
12	**BT151(F)**						●	●					
16	**BTY79**					●	●	●	●	●			
16	**BTW38**							●	●	●			
16	**BTW42**							●	●	●			
20	**BT152**					●		●	●				
25	**BT145**						●	●	●				
25	**BTW45**					●		●	●	●	●		
25	**BTY91**					●	●	●	●				
32	**BTW40**					●		●	●				

Fast gate turn–off thyristors (page S28)

$V_{DRM\ max}$ (V)

I_{TCRM} A		600	850	1000	1200	1300	1500
12	**BT157**					●	●
25	**BTW58**			●		●	●
25	**BTV58**	●	●	●			
50	**BTR59**		●			●	
50	**BTS59**		●	●	●		

Triacs (page S29)

$V_{DRM\ max}$ (V)

$I_{T\ (RMS)}$ A		400	500	600	800	1000	1200	1400	1600
	BT134		●	●	●				
4	**BT136**		●	●	●				
8	**BT137**		●	●	●				
12	**BT138**		●	●	●				
15	**BTW43G**			●	●	●	●		
15	**BTW43H**			●	●	●	●		
16	**BT139**		●	●	●				
20	**BTA140**		●	●	●				

Bi–directional devices (page S30)

Diac **BR100:** $V_{(BO)} = 28$ to 36 V; $I_{FRM} < 2$ A. Thyristor tetrode **BRY39:** $V_{RRM\ max} = 70$ V; $I_{T\ max} = 250$ mA.

General purpose thyristors

For detailed information on these and other types see Data Handbook S2

Voltage range	200 to 1200 V
Current range	0.8 to 32 A

			ratings					characteristics		
type	st.	case	$I_{T(RMS)}$ A	$I_{T(AV)max}$ T_{mb} = 85 °C A	V_{RRM} max V	I_{TSM} max at T_j max t = 10 ms A	dI_T/dt max A/µs	dV_D/dt max at T_j max V/µs	V_{GT} min V_D = 6 V; T_j = 25 °C V	I_{GT} min at T_j max mA
BTW38–1000R	C	TO–64(2)	16	10	1000	150	50	200	1.5	50
BTW38–600R	C	TO–64(2)	16	10	600	150	50	200	1.5	50
BTW38–800R	C	TO–64(2)	16	10	800	150	50	200	1.5	50
BTW42–1000R	C	TO–64(2)	16	10	1000	150	50	500	1.5	50
BTW42–600R	C	TO–64(2)	16	10	600	150	50	500	1.5	50
BTW42–800R	C	TO–64(2)	16	10	800	150	50	500	1.5	50
BTY79–1000R	C	TO–64(1)	16	10	1000	150	50	200	1.5	30
BTY79–400R	C	TO–64(1)	16	10	400	150	50	200	1.5	30
BTY79–500R	C	TO–64(1)	16	10	500	150	50	200	1.5	30
BTY79–600R	C	TO–64(1)	16	10	600	150	50	200	1.5	30
BTY79–800R	C	TO–64(1)	16	10	800	150	50	200	1.5	30
BT148–400R	P	SOT–82	4	2.5	400	25	50	5	1.5	0.2
BT148–500R	P	SOT–82	4	2.5	500	25	50	5	1.5	0.2
BT148–600R	P	SOT–82	4	2.5	600	25	50	5	1.5	0.2
BT150	P	TO–220AB	4	2.5	500	25	50	5	1.5	200
BT151–500R	P	TO–220AB	12	7.5	500	100	50	200	1.5	15
BT151–650R	P	TO–220AB	12	7.5	650	100	50	200	1.5	15
BT151–800R	P	TO–220AB	12	7.5	800	100	50	200	1.5	15
BT169B–200	P	TO–92	0.8	0.5	200	8	30	100	0.8	0.2
BT169D–400	P	TO–92	0.8	0.5	400	8	30	100	0.8	0.2
BT169M–600	P	TO–92	0.8	0.5	600	8	30	100	0.8	0.2

General purpose thyristors

For detailed information on these and other types see Data Handbook S2

			ratings					characteristics		
type	st.	case	$I_{T(RMS)}$ A	$I_{T(AV)max}$ T_{mb} = 85 °C A	V_{RRM} max V	I_{TSM} max at T_j max t = 10 ms A	dI_T/dt max A/µs	dV_D/dt max at T_j max V/µs	V_{GT} min V_D = 6 V; T_j = 25 °C V	I_{GT} min at T_j max mA
BTW40–400R	C	TO–48(2)	32	20	400	400	100	100	1.5	75
BTW40–400RU	C	TO–48(1)	32	20	400	400	100	100	1.5	75
BTW40–600R	C	TO–48(2)	32	20	600	400	100	100	1.5	75
BTW40–600RU	C	TO–48(1)	32	20	600	400	100	100	1.5	75
BTW40–800R	C	TO–48(2)	32	20	800	400	100	100	1.5	75
BTW40–800RU	C	TO–48(1)	32	20	800	400	100	100	1.5	75
BTW45–1000R	C	TO–48(2)	25	16	1000	300	100	200	1.5	75
BTW45–1000RU	C	TO–48(1)	25	16	1000	300	100	200	1.5	75
BTW45–1200R	C	TO–48(2)	25	16	1200	300	100	200	1.5	75
BTW45–1200RU	C	TO–48(1)	25	16	1200	300	100	200	1.5	75
BTW45–400R	C	TO–48(2)	25	16	400	300	100	200	1.5	75
BTW45–400RU	C	TO–48(1)	25	16	400	300	100	200	1.5	75
BTW45–600R	C	TO–48(2)	25	16	600	300	100	200	1.5	75
BTW45–600RU	C	TO–48(1)	25	16	600	300	100	200	1.5	75
BTW45–800R	C	TO–48(2)	25	16	800	300	100	200	1.5	75
BTW45–800RU	C	TO–48(1)	25	16	800	300	100	200	1.5	75
BTY91–400R	C	TO–48(1)	25	14	400	200	20	200	3	40
BTY91–500R	C	TO–48(1)	25	14	500	200	20	200	3	40
BTY91–600R	C	TO–48(1)	25	14	600	200	20	200	3	40
BTY91–800R	C	TO–48(1)	25	14	800	200	20	200	3	40
BT145–500R	P	TO–220AB	25	16	500	300	200	200	1.5	35
BT145–600R	P	TO–220AB	25	16	600	300	200	200	1.5	35
BT145–800R	P	TO–220AB	25	16	800	300	200	200	1.5	35
BT152–400R	P	TO–220AB	20	13	400	200	200	200	1.5	32
BT152–600R	P	TO–220AB	20	13	600	200	200	200	1.5	32
BT152–800R	P	TO–220AB	20	13	800	200	200	200	1.5	32

TO–220AB versions are also available in F–pack
Reverse polarity (anode to stud) **R**

Fast gate turn-off thyristors

For detailed information on these and other types see Data Handbook S2

Voltage range	800 to 1500 V
Controllable current range	12 to 120 A

type	st	case	$I_{T(AV)}$ max A	I_{TCRM} max controllable anode current A	I_{TSM} max T_{mb} = 120 °C; T = 10 ms A	V_{DRM} max V/µs	dV_D/dt max V/µs	V_{GT} min V	I_{GT} min mA	t_f* max µs
BTR59–1300R	P	SOT–93	10	50	100	1300	10000	1.5	500	0.25
BTR59–800R	P	SOT–93	10	50	100	800	10000	1.5	500	0.25
BTS59–1000R	P	SOT–93	15	50	100	1000	10000	1.5	300	0.25
BTS59–1200R	P	SOT–93	15	50	100	1200	10000	1.5	300	0.25
BTS59–850R	P	SOT–93	15	50	100	850	10000	1.5	300	0.25
BTV58–1000R	P	TO–220AB	10	25	75	1000	10000	1.5	200	0.25
BTV58–600R	P	TO–220AB	10	25	75	600	10000	1.5	200	0.25
BTV58–850R	P	TO–220AB	10	25	75	850	10000	1.5	200	0.25
BTW58–1000R	P	TO–220AB	6.5	25	50	1000	10000	1.5	200	0.25
BTW58–1300R	P	TO–220AB	6.5	25	50	1300	10000	1.5	200	0.25
BTW58–1500R	P	TO–220AB	6.5	25	50	1500	10000	1.5	200	0.25
BT157–1300R	P	TO–220AB	3.2	12	20	1300	10000	1.5	200	0.2
BT157–1500R	P	TO–220AB	3.2	12	20	1500	10000	1.5	200	0.25

* when switching off 0.2 x $I_{TCRMmax}$; $-V_{GG}$ = 10 V; L_G = 0.8 µH, T_{mb} = 25 °C.

TO–220AB and SOT–93 versions are also available in F–pack

General data
Triacs

For detailed information on these and other types see Data Handbook S2

Voltage range 500 to 1200 V
Current range 4 to 20 A

High quality triacs for motor control, furnace control, heating, light dimming, contactor drive, static switching, etc. They have a high surge capability and excellent high commutating characteristics.

				ratings					characteristics				
									dV$_D$dt max at T$_{j\,max}$				
type*	suffix = V$_{DRM}$ max	st.	case	I$_{T(RMS)}$ A	I$_{TRM}$ A	I$_{TSM}$ and T$_{j\,max}$; 10 ms A	I^{2}t A^{2}s	dI$_T$/dt A/µs	normal V/µs	commutating at: V/µs	dI$_T$/dt A/ms	V$_{GT}$ min V	I$_{GT}$ min mA
BT134	**– 500R** **– 600R** **– 800R**	P	SOT–82	2.5	25	25	4	10	100	10	2.5	1.5	35
BT136	**– 500** **– 600** **– 800**	P	TO–220AB	4	25	25	–	10	100	10	1.8	1.5	35*
BT137	**– 500** **– 600** **– 800**	P	TO–220AB	8	55	55	15	20	100	10	3.6	1.5	35*
BT138	**– 500** **– 600** **– 800**	P	TO–220AB	12	90	90	40	30	100	10	5.4	1.5	35*
BT139	**– 500** **– 600** **– 800**	P	TO–220AB	16	130	130	65	30	100	10	7.2	1.5	35*
BTW43G	**– 600** **– 800** **–1000** **–1200**	C	TO–64	15	50	120	72	50	200	10	5	2.5	100
BTW43H	**– 600** **– 800** **–1000** **–1200**	C	TO–64	15	50	120	72	50	200	10	12	2.5	100
BTA140	**– 500** **– 600** **– 800**	P	TO–220AB	20	200	200	90	30	100	10	9.0	1.5	35

* variants with different gate sensitivities are available as follows:

Suffix to type no.	I$_{GT\,min}$
G	50 mA
F	25 mA
E	10 mA
D	5 mA

TO–220AB versions are also available in F–pack

For detailed information on these and other types see Data Handbook S2

Bi–directional devices
status = P

type			
Diac BR100	breakover voltage	$V_{(BO)}$	28 to 36 V
	repetitive peak current	I_{FRM}	max 2 A
	breakback voltage	V_O	min 5 V

type	case			
BRY39 thyristors tetrode	TO–72(3)	$V_D = V_R$	max 70 V	characteristics at T_j = 25 °C
		I_{TSM} at T_j max		V_{GKT} > 0.5 V
		t = 10 µs	max 3 A	I_{GKT} > 1 µA
		I_T	max 250 mA	$-V_{GAT}$ > 1 V
		dI_T/dt	max 20 A/µs	$-I_{GAT}$ > 100 µA

Transistors for audio and general–purpose applications

For detailed information on these and other types see Data Handbook S3

Voltage range	20 to 80 V
Current range	500 to 1000 mA
D.C. current gain h_{FE}	40 to 800

			ratings				characteristics				
type	pol	case	V_{CEO} V	I_C mA	P_{tot} mW	at T_{amb} °C	h_{FE} (h_{fe}) min	h_{FE} (h_{fe}) max	at I_C mA	f_T typ MHz	F typ dB
BC107	NPN	TO–18	45	100	300	25	110	450	2	300	2
BC108	NPN	TO–18	20	100	300	25	110	800	2	300	2
BC109	NPN	TO–18	20	100	300	25	200	800	2	300	1.2
BC140	NPN	TO–39(1)	40	1000	3700	45*	63	250	100		
BC141	NPN	TO–39(1)	60	1000	3700	45*	63	250	100		
BC160	PNP	TO–39(1)	40	1000	3700	45*	63	250	100		
BC161	PNP	TO–39(1)	60	1000	3700	45*	63	250	100		
BC177	PNP	TO–18	45	100	300	25				150	
BC178	PNP	TO–18	25	100	300	25				150	
BC179	PNP	TO–18	20	100	300	25				150	
BC327	PNP	TO–92VAR	45	500	800	25	100	600	100	100	
BC327A	PNP	TO–92VAR	60	500	800	25	100	400	100	100	
BC328	PNP	TO–92VAR	25	500	800	25	100	600	100	100	
BC337	NPN	TO–92VAR	45	500	800	25	100	600	100	200	
BC337A	NPN	TO–92VAR	60	500	800	25	100	400	100	200	
BC338	NPN	TO–92VAR	25	500	800	25	100	600	100	200	
BC368	NPN	TO–92VAR	20	1000	800	25	85	375	500	60	
BC369	PNP	TO–92VAR	20	1000	800	25	85	375	500	60	
BC375	NPN	TO–92VAR	20	1000	800	25	60	340	150	150	
BC376	PNP	TO–92VAR	20	1000	800	25	60	340	150	150	
BC516	PNP	TO–92VAR	30	400	625	25	30000		20	220	
BC517	NPN	TO–92VAR	30	400	625	25	30000		20	220	
BC546	NPN	TO–92VAR	65	100	500	25	110	450	2	300	2
BC547	NPN	TO–92VAR	45	100	500	25	110	800	2	300	2
BC548	NPN	TO–92VAR	30	100	500	25	110	800	2	300	2
BC549	NPN	TO–92VAR	30	100	500	25	200	800	2	300	1.2
BC550	NPN	TO–92VAR	45	100	500	25	200	800	2	300	1
BC556	PNP	TO–92VAR	65	100	500	25	75	475	2	200	2
BC557	PNP	TO–92VAR	45	100	500	25	75	800	2	200	2
BC558	PNP	TO–92VAR	30	100	500	25	75	800	2	200	2
BC559	PNP	TO–92VAR	30	100	500	25	125	800	2	200	1
BC560	PNP	TO–92VAR	45	100	500	25	125	800	2	200	1
BC635	NPN	TO–92VAR	45	1000	1000	25	40	250	150	130	
BC637	NPN	TO–92VAR	60	1000	1000	25	40	250	150	130	
BC639	NPN	TO–92VAR	80	1000	1000	25	40	250	150	130	

* T_{case}

Transistors for audio and general–purpose applications (cont.)

For detailed information on these and other types see Data Handbook S3

			ratings				characteristics				
type	pol	case	V_{CEO} V	I_C mA	P_{tot} mW	at T_{amb} °C	h_{FE} (h_{fe}) min	h_{FE} (h_{fe}) max	at I_C mA	f_T typ MHz	F typ dB
BC636	PNP	TO–92VAR	45	1000	1000	25	40	250	150	50	
BC638	PNP	TO–92VAR	60	1000	1000	25	40	250	150	50	
BC640	PNP	TO–92VAR	80	1000	1000	25	40	250	150	50	
BCY56	NPN	TO–18	45	100	300	25	100	450	2	85	1.5
BCY57	NPN	TO–18	20	100	300	25	200	800	2	100	1.5
BCY58VII	NPN	TO–18	32	200	330	45*	120	220	2		2
BCY58VIII	NPN	TO–18	32	200	330	45*	180	310	2		2
BCY58IX	NPN	TO–18	32	200	330	45*	250	460	2		2
BCY58X	NPN	TO–18	32	200	330	45*	380	630	2		2
BCY59VII	NPN	TO–18	45	200	330	45*	120	220	2		2
BCY59VIII	NPN	TO–18	45	200	330	45*	180	310	2		2
BCY59IX	NPN	TO–18	45	200	330	45*	250	460	2		2
BCY59X	NPN	TO–18	45	200	330	45*	380	630	2		2
BCY70	PNP	TO–18	40	200	350	25	100		10		2
BCY71	PNP	TO–18	45	200	350	25	100		10		
BCY72	PNP	TO–18	25	200	350	25	100		10		
BCY78	PNP	TO–18	32	200	345	45	380	630	2	180	2
BCY78X	PNP	TO–18	32	200	345	45				180	2
BCY79	PNP	TO–18	45	200	345	25	120	460	2	180	2
BCY87**	NPN	TO–71(1)	40		150	25	100	450	0.05		
BCY88**	NPN	TO–71(1)	40		150	25	100	450	0.05		
BCY89**	NPN	TO–71(1)	40		150	25	100	450	0.05		
MPS6513	NPN	TO–92	30	100	625	25	60		100		
MPS6514	NPN	TO–92	25	100	625	25	90		100		
MPS6515	NPN	TO–92	25	100	625	25	150		100		
MPS6517	PNP	TO–92	40	100	625	25	60		100		
MPS6518	PNP	TO–92	40	100	625	25	90		100		
MPS6519	PNP	TO–92	25	100	625	25	150		100		
MPS6520	NPN	TO–92	25	100	625	25	200	400	2		
MPS6521	NPN	TO–92	25	100	625	25	300	600	2		
MPS6522	PNP	TO–92	25	100	625	25	200	400	2		
MPS6523	PNP	TO–92	25	100	625	25	400	600	2		
MPSA05	NPN	TO–92	60	500	625	25	50		10		
MPSA06	NPN	TO–92	80	500	625	25	50		10		
MPSA55	PNP	TO–92	60	500	625	25	50		100		
MPSA56	PNP	TO–92	80	500	625	25	50		100		

* T_{case}

** Dual transistors for differential amplifiers

Transistors for audio and general–purpose applications (cont.)

For detailed information on these and other types see Data Handbook S3

type	pol	case	ratings				characteristics				
			V_{CEO} V	I_C mA	P_{tot} mW	at T_{amb} °C	h_{FE} (h_{fe}) min	h_{FE} (h_{fe}) max	at I_C mA	f_T typ MHz	F typ dB
2N930	NPN	TO–18	45	30	300	25	100	300	10	80	2
2N2484	NPN	TO–18	60	50*	360	25	100	500	10	80	
2N3019	NPN	TO–39(1)	80	1000	800	25	100	300	150		
2N4030	PNP	TO–39(1)	60	1000	800	25	25		500		
2N4031	PNP	TO–39(1)	80	1000	800	25	25		500		
2N4032	PNP	TO–39(1)	60	1000	800	25	70		500		
2N4033	PNP	TO–39(1)	80	1000	800	25	70		500		
2N4123	NPN	TO–92	30	200	350	25	50	150	2		
2N4124	NPN	TO–92	25	200	350	25	120	360	2		
2N4125	PNP	TO–92	30	200	350	25	50	150	2		
2N4126	PNP	TO–92	25	200	350	25	120	360	2		
2N4400	NPN	TO–92	40	600	625	25	50	150	100		
2N4401	NPN	TO–92	40	600	625	25	100	300	100		
2N4402	PNP	TO–92	40	600	625	25	50	150	150		
2N4403	PNP	TO–92	40	600	625	25	100	300	150		
2N5086	PNP	TO–92	50	50	625	25	150		1		
2N5087	PNP	TO–92	50	50	625	25	250		1		
2N5088	NPN	TO–92	30	50	625	25	350		1		
2N5089	NPN	TO–92	25	50	625	25	450		1		
2N5400	PNP	TO–92	120	600	625	25	40		10		
2N5401	PNP	TO–92	150	600	625	25	60		10		
2N5550	NPN	TO–92	140	600	500	25	60		10		
2N5551	NPN	TO–92	160	600	500	25	80		10		

* I_{CM}

Transistors for h.f. applications

For detailed information on these and other types see Data Handbook S3

type	pol	case	ratings				characteristics						
			V_{CEO} V	I_C mA	P_{tot} mW	at T_{amb} °C	h_{FE} (h_{fe}) min	h_{FE} (h_{fe}) max	at I_C mA	C_{re} typ pF	f_T typ MHz	F typ dB	at f MHz
BF198	NPN	TO–92VAR	30	25	500	25				0.2	400	3	35
BF199	NPN	TO–92VAR	25	25	500	25				0.34	550		
BF240	NPN	TO–92VAR	40	25	250	45				0.34	380	1.5	0.002
BF241	NPN	TO–92VAR	40	25	250	45				0.34	350	2	0.002
BF324	PNP	TO–92VAR	30	25	250	45				0.1*	450	3	100
BF370	NPN	TO–92VAR	15	100	500	25	40		10	1.6		3	100
BF420	NPN	TO–92VAR		50	830	25	50		25				
BF421	PNP	TO–92VAR		50	830	25	50		25				
BF422	NPN	TO–92VAR	250	50	830	25	50		25				
BF423	PNP	TO–92VAR	250	50	830	25	50		25				
BF450	PNP	TO–92VAR	40	25	250	45				0.35	325	2	0.001
BF451	PNP	TO–92VAR	40	25	250	45				0.35	325	2	0.001
BF483	NPN	TO–92VAR	250	50	830	25	50		25				
BF485	NPN	TO–92VAR	300	50	830	25	50		25				
BF487	NPN	TO–92VAR	400	50	830	25	50		25				
BF494	NPN	TO–92VAR	20	30	300	75				0.85	260	4	100
BF495	NPN	TO–92VAR	30	30	300	75				0.85	200	4	100
BF496	NPN	TO–92VAR	20	20	300	75				0.8	550	2	100
BF926	PNP	TO–92VAR	20	25	250	45				0.5	350	5	200
BF936	PNP	TO–92VAR	20	25	250	45	25		1	0.9	350	5	200
BF939	PNP	TO–92VAR	25	20	225	55				0.7	750	2.5	200
BF967	PNP	SOT–37	30	20	160	55	15		3	0.45	900	4	800

* C_{br}

Transistors for h.f. applications

For detailed information on these and other types see Data Handbook S3

			ratings				characteristics							
type	pol	case	V_{CEO} V	I_C mA	P_{tot} mW	at T_{amb} °C	h_{FE} (h_{fe}) min	h_{FE} (h_{fe}) max	at I_C mA	C_{re} typ pF	f_T typ MHz	F typ dB	at f MHz
BF970	PNP	SOT–37	35	30	160	55	25		3	0.475	900	4.7	800
BF970A	PNP	SOT–37	35	30	160	55	25		3	0.475	900	4.7	800
BF979	PNP	SOT–37	20	30*	140	55	20		10	0.65	1350	4.5	800
BFR54	NPN	TO–92VAR	15	500*	500	25	40		10		500		
MPSA42	NPN	TO–92	300	500	625	25	40		30				
MPSA43	NPN	TO–92	200	500	625	25	40		30				
MPSA92	PNP	TO–92	300	500	625	25	25		30				
MPSA93	PNP	TO–92	200	500	625	25	25		30				

* I_{CM}

Transistors for switching applications

For detailed information on these and other types see Data Handbook S3

			ratings				characteristics					
type	pol*	case	V_{CEO} V	I_C mA	P_{tot} at mW	T_{amb} °C	h_{FE} (h_{fe}) min–max	at I_C mA	f_T typ MHz	t_{off} max at ns	I_C mA	remarks
BC516	P	TO–92 var	30	400	625	25	> 30000	20	220			darlingtons
BC517	N											
BCX58	N	TO–92 var	32	200	450	25			> 125			
BCX59			45									
BCX78	P	TO–92 var	32	200	450	25			> 200			
BCX79			45									
BCY58	N	TO–18	32	200	330	45	80–1000		280	800	10	
BCY59			45									
BCY65	N	TO–18	60	200	330	45	200–330	2	⩾ 125	800	10	
BCY70	P	TO–18	40	200	350	25	> 100	10	450	420	10	
BCY71			45							–	–	BCY71:low–noise
BCY72			25							420	10	
BCY78	P	TO–18	32	200	345	45	80–1000	10	180	800	10	amplyfing and switching
BCY79			45									
BFT44	P	TO–39	300	500	5000	50**	50–150	10	70	125	500	
BFT45			250									
BFX34	N	TO–39	60	2000	5000	25**	40–150	2000	> 70	1200	5000	inverter and switching reg.
BFY50	N	TO–39	35	1000	5000	50**	typ 112	150	140	360	150	general purpose
BFY51			30				typ 123		160			
BFY52			20				typ 142		185			
BFY55	N	TO–39	35	1000	800	25	40–120	150	> 60			
BSR50	N	TO–92 var	45***	1000	800	25	> 2000	500		1500	500	darlingtons
BSR51			60***									
BSR52			80***									
BSR60	P	TO–92 var	45***	1000	800	25	> 2000	500		1500	500	darlingtons
BSR61			60***									
BSR62			80***									
BSS38	N	TO–92 var	100	100	500	25	> 20	4	> 60	1000	15	driver for numerical ind. tube
BSS50	N	TO–39	45***	1000	5000	25**	> 2000	500		1500	500	darlingtons
BSS51			60***									
BSS52			80***									

* polarity indication P = p–n–p
N = n–p–n

** T_{case}

*** V_{CER}

PHILIPS

Transistors for switching applications (cont.)

For detailed information on these and other types see Data Handbook S3

			ratings				characteristics					
type	pol	case	V_{CEO} V	I_C mA	P_{tot} mW	at T_{amb} °C	h_{FE} (h_{fe}) min	h_{FE} (h_{fe}) max	at I_C mA	f_T typ MHz	t_{off} max ns	at f mA
BSS60	PNP	TO–39(1)		1000	800	25	2000		500		1500	
BSS61	PNP	TO–39(1)		1000	800	25	2000		500		1500	
BSS62	PNP	TO–39(1)		1000	800	25	2000		500		1500	
BSS68	PNP	TO–92VAR	100	100	500	25	30		25			
BSV15–10	PNP	TO–39(1)	40	1000	800	25	63	160	100			
BSV15–16	PNP	TO–39(1)	40	1000	800	25	100	250	100			
BSV16–10	PNP	TO–39(1)	60	1000	800	25	63	160	100			
BSV16–16	PNP	TO–39(1)	60	1000	800	25	100	250	100			
BSV17–10	PNP	TO–39(1)	80	1000	800	25	63	160	100			
BSV64	NPN	TO–39(1)	60	2000	5000	50*	40		2000	100		
BSW66A	NPN	TO–39(1)	100	1000	800	25	30		500	130	900	500
BSW67A	NPN	TO–39(1)	120	1000	800	25	30		500	130	900	500
BSW68A	NPN	TO–39(1)	150	1000	800	25	30		500	130	900	500
BSX20	NPN	TO–18	15		360	25	40	120	10	500		
BSX45–10	NPN	TO–39(1)	40	1000	6250	25*	63	160	100	50		
BSX45–16	NPN	TO–39(1)	40	1000	6250	25*	100	250	100	50		
BSX46–10	NPN	TO–39(1)	60	1000	6250	25*	63	160	100	50		
BSX46–16	NPN	TO–39(1)	60	1000	6250	25*	100	250	100	50		
BSX47–10	NPN	TO–39(1)	80	1000	6250	25*	63	160	100	50		
BSX59	NPN	TO–39(1)	45	1000	800	25	30	90	500			
BSX60	NPN	TO–39(1)	30	1000	800	25	30	90	500			
BSX61	NPN	TO–39(1)	45	1000	800	25	30	90	500			
MPSA13	NPN	TO–92		500	625	25	5000		10			
MPSA14	NPN	TO–92		500	625	25	10000		10			
MPSA42	NPN	TO–92	300	500	625	25	40		30			
MPSA43	NPN	TO–92	200	500	625	25	40		30			
MPSA63	PNP	TO–92		500	625	25	5000		10			
MPSA64	PNP	TO–92		500	625	25	10000		10			
MPSA92	PNP	TO–92	300	500	625	25	25		30			
MPSA93	PNP	TO–92	200	500	625	25	25		30			

* T_{case}

Transistors for switching applications (cont.)

For detailed information see Data Handbook S3

type	pol	case	ratings				characteristics					
			V_{CEO} V	I_C mA	P_{tot} mW	at T_{amb} °C	h_{FE} (h_{fe}) min	h_{FE} (h_{fe}) max	at I_C mA	f_T typ MHz	t_{off} max ns	at I_C mA
PH2222	NPN	TO–92VAR	30	800	625	25	75		10		285	150
PH2222A	NPN	TO–92VAR	40	800	625	25	75		10		285	150
PH2369	NPN	TO–92VAR	15	600	500	25	40	120	10		18	10
PH2907	PNP	TO–92VAR	40	600	625	25	100	300	150		100	150
PH2907A	PNP	TO–92VAR	60	600	625	25	100	300	150		100	150
PH5415	PNP	TO–92VAR	200	1000	625	25	30	150	50			
PH5416	PNP	TO–92VAR	300	1000	625	25	30	120	50			
PN2222	NPN	TO–92	30	600	625	25	100	300	150		285	150
PN2222A	NPN	TO–92	40	600	625	25	100	300	150		285	150
PN2369	NPN	TO–92	15	600	625	25	40	120	10		18	10
PN2369A	NPN	TO–92	15	600	625	25	40	120	10		18	10
PN2907	PNP	TO–92	40	600	625	25	100	300	150		100	150
PN2907A	PNP	TO–92	60	600	625	25	100	300	150		100	150
PN3439	NPN	TO–92	350	1000	625	25	30		2			
PN3440	NPN	TO–92	250	1000	625	25	40		20			
PN5415	PNP	TO–92	200	1000	625	25	30	150	50			
PN5416	PNP	TO–92	300	1000	625	25	30	120	50			
2N1613	NPN	TO–39(1)			800	25	40	120	150			
2N1711	NPN	TO–39(1)			800	25	100	300	150			
2N1893	NPN	TO–39(1)	80	500	800	25	40	120	150			
2N2219	NPN	TO–39(1)	30	800	800	25	100	300	150		285	150
2N2219A	NPN	TO–39(1)	40	800	800	25	100	300	150		285	150
2N2222	NPN	TO–18	30	800	500	25	100	300	150		285	150
2N2222A	NPN	TO–18	40	800	500	25	100	300	150		285	150
2N2297	NPN	TO–39(1)	35	1000	800	25	40	120	150			
2N2369	NPN	TO–18	15		360	25	40	120	10		18	10
2N2369A	NPN	TO–18	15	200	360	25	40	120	10		18	10
2N2904	PNP	TO–39(1)	40	600	600	25	40	120	150		100	150
2N2904A	PNP	TO–39(1)	60	600	600	25	40	120	150		100	150
2N2905	PNP	TO–39(1)	40	600	600	25	100	300	150		100	150
2N2905A	PNP	TO–39(1)	60	600	600	25	100	300	150		100	150

For detailed information see Data Handbook S3

			ratings				characteristics					
type	pol	case	V_{CEO} V	I_C mA	P_{tot} mW	at T_{amb} °C	h_{FE} (h_{fe}) min	h_{FE} (h_{fe}) max	at I_C mA	f_T typ MHz	t_{off} max ns	at I_C mA
2N2906	PNP	TO–18	40	600	400	25	40	120	150		100	150
2N2906A	PNP	TO–18	60	600	400	25	40	120	150		100	150
2N2907	PNP	TO–18	40	600	400	25	100	300	150		100	150
2N2907A	PNP	TO–18	60	600	400	25	100	300	150		100	150
2N3019	NPN	TO–39(1)	80	1000	800	25	100	300	150			
2N3020	NPN	TO–39(1)	80	1000	800	25	40	120	150			
2N3053	NPN	TO–39(1)	40	700		50	250	150				
2N3903	NPN	TO–92	40	200	350	25	50	150	10		225	10
2N3904	NPN	TO–92	40	200	350	25	100	300	10		250	10
2N3905	PNP	TO–92	40	200	350	25	50	150	10		260	10
2N3906	PNP	TO–92	40	200	350	25	100	300	10		300	10
2N4030	PNP	TO–39(1)	60	1000	800	25	25		500		400	500
2N4031	PNP	TO–39(1)	80	1000	800	25	25		500		400	500
2N4032	PNP	TO–39(1)	60	1000	800	25	70		500		400	500
2N4033	PNP	TO–39(1)	80	1000	800	25	70		500		400	500
2N5400	PNP	TO–92	120	600	625	25	40		10			
2N5401	PNP	TO–92	150	600	625	25	60		10			
2N5415	PNP	TO–39(1)	200	1000	1000	50	30	150	50			
2N5416	PNP	TO–39(1)	300	1000	1000	50	30	120	50			
2N5550	NPN	TO–92	140	600	500	25	60		10			
2N5551	NPN	TO–92	160	600	500	25	80		10			

For detailed information on these and other types see Data Handbook S3, S4 and S10

Programmable unijunction transistors

		ratings				characteristics			
type	case	V_{GA} V	I_E mA	I_{ARM} mA	dI_A/dT A/µs	I_p max µA	I_V min µA	T_r max ns	remarks
BRY39	TO–72	70	175	2,5	20	5	25	80	characteristics measured with R_G = 10 kΩ
BRY56	TO–92 var						2		

Silicon controlled switches

		ratings					characteristics				
type	case	V_{CBO} V	I_E mA	I_{ERM} A	P_{tot} at mw	T_{amb} °C	V_{AK} max V	I_H max mA	t_{on} max µs	t_q max µs	remarks
BRY39		70							1,5	8	with R_G = 10 kΩ

Thyristor tetrode

		ratings				characteristics at T_j = 25°C					
type	case	I_T mA	I_{TRM} A	I_{TSM} A	dI_T/dt A/µs	V_{GKT} min V	I_{GKT} min µA	V_{GAT} min V	I_{GAT} min µA	t_q max µs	remarks
BRY39	TO–72	250	2.5	3	20	0.5	1	–1	–100	3	V_{RRMmax} = 70V

Alpha numeric list

For detailed information on these and other types see Data Handbook S3

type	pol	case	V_{CEO} V	I_C mA
BCF29	PNP	SOT–23	32	100
BCF30	PNP	SOT–23	32	100
BCF32	NPN	SOT–23	32	100
BCF33	NPN	SOT–23	32	100
BCF70	PNP	SOT–23	50	100
BCF81	NPN	SOT–23	45	100
BCV26	PNP	SOT–23	30	300
BCV27	NPN	SOT–23	30	300
BCV61	NPN	SOT–143	30	100
BCV62	PNP	SOT–143	30	100
BCV63	PNP	SOT–143	30	100
BCV64	PNP	SOT–143	30	100
BCV65	PNP	SOT–143	30	100
BCV71	NPN	SOT–23	60	100
BCV72	NPN	SOT–23	60	100
BCW29	PNP	SOT–23	32	100
BCW30	PNP	SOT–23	32	100
BCW31	NPN	SOT–23	32	100
BCW32	NPN	SOT–23	32	100
BCW33	NPN	SOT–23	32	100
BCW60A	NPN	SOT–23	32	200
BCW60B	NPN	SOT–23	32	200
BCW60C	NPN	SOT–23	32	200
BCW60D	NPN	SOT–23	32	200
BCW61A	PNP	SOT–23	32	200
BCW61B	PNP	SOT–23	32	200
BCW61C	PNP	SOT–23	32	200
BCW61D	PNP	SOT–23	32	200
BCW69	PNP	SOT–23	45	100
BCW70	PNP	SOT–23	45	100
BCW71	NPN	SOT–23	45	100
BCW72	NPN	SOT–23	45	100
BCW81	NPN	SOT–89	45	100
BCW89	PNP	SOT–23	60	100
BCX17	PNP	SOT–23	45	500
BCX18	PNP	SOT–23	25	500
BCX19	NPN	SOT–23	45	500
BCX20	NPN	SOT–23	25	500
BCX51	PNP	SOT–89	45	1000
BCX52	PNP	SOT–89	60	1000
BCX53	PNP	SOT–89	80	1000
BCX54	NPN	SOT–89	45	1000
BCX70G	NPN	SOT–23	45	200
BCX70H	NPN	SOT–23	45	200
BCX70J	NPN	SOT–23	45	200
BCX70K	NPN	SOT–23	45	200
BCX71G	PNP	SOT–23	45	200
BCX71H	PNP	SOT–23	45	200
BCX71J	PNP	SOT–23	45	200
BCX71K	PNP	SOT–23	45	200

For detailed information on these and other types see Data Handbook S3

type	pol	case	V_{CEO} V	I_C mA
BCX78	PNP	TO–92	32	100
BCX79	PNP	TO–92	45	100
BCY56	NPN	TO–18	45	100
BCY57	NPN	TO–18	20	100
BCY58VII	NPN	TO–18	32	200
BCY58VIII	NPN	TO–18	32	200
BCY58IX	NPN	TO–18	32	200
BCY58X	NPN	TO–18	32	200
BCY59VII	NPN	TO–18	45	200
BCY59VIII	NPN	TO–18	45	200
BCY59IX	NPN	TO–18	45	200
BCY59X	NPN	TO–18	45	200
BCY65VII	NPN	TO–18	60	200
BCY65VIII	NPN	TO–18	60	200
BCY65IX	NPN	TO–18	60	200
BCY70	PNP	TO–18	40	200
BCY71	PNP	TO–18	45	200
BCY72	PNP	TO–18	25	200
BCY78	PNP	TO–18	32	200
BCY78X	PNP	TO–18	32	200
BCY79	PNP	TO–18	45	200
BCY87	NPN	TO–71(1)	40	
BCY88	NPN	TO–71(1)	40	
BCY89	NPN	TO–71(1)	40	
BC107	NPN	TO–18	45	100
BC108	NPN	TO–18	20	100
BC109	NPN	TO–18	20	100
BC140	NPN	TO–39(1)	40	1000
BC141	NPN	TO–39(1)	60	1000
BC160	PNP	TO–39(1)	40	1000
BC161	PNP	TO–39(1)	60	1000
BC177	PNP	TO–18	45	100
BC178	PNP	TO–18	25	100
BC179	PNP	TO–18	20	100
BC327	PNP	TO–92VAR	45	500
BC327A	PNP	TO–92VAR	60	500
BC328	PNP	TO–92VAR	25	500
BC337	NPN	TO–92VAR	45	500
BC337A	NPN	TO–92VAR	60	500
BC338	NPN	TO–92VAR	25	500
BC368	NPN	TO–92VAR	20	1000
BC369	PNP	TO–92VAR	20	1000
BC375	NPN	TO–92VAR	20	1000
BC376	PNP	TO–92VAR	20	1000
BC516	PNP	TO–92VAR	30	400
BC517	NPN	TO–92VAR	30	400
BC546	NPN	TO–92VAR	65	100
BC547	NPN	TO–92VAR	45	100
BC548	NPN	TO–92VAR	30	100
BC549	NPN	TO–92VAR	30	100
BC550	NPN	TO–92VAR	45	100
BC556	PNP	TO–92VAR	65	100

For detailed information on these and other types see Data Handbook S3

type	pol	case	V_{CEO} V	I_C mA
BC557	PNP	TO–92VAR	45	100
BC558	PNP	TO–92VAR	30	100
BC559	PNP	TO–92VAR	30	100
BC560	PNP	TO–92VAR	45	100
BC635	NPN	TO–92VAR	45	1000
BC636	PNP	TO–92VAR	45	1000
BC637	NPN	TO–92VAR	60	1000
BC638	PNP	TO–92VAR	60	1000
BC639	NPN	TO–92VAR	80	1000
BC640	PNP	TO–92VAR	80	1000
BC807	PNP	SOT–23	45	500
BC808	PNP	SOT–23	25	500
BC817	NPN	SOT–23	45	500
BC818	NPN	SOT–23	25	500
BC846	NPN	SOT–23	65	100
BC847	NPN	SOT–23	45	100
BC848	NPN	SOT–23	30	100
BC849	NPN	SOT–23	30	100
BC850	NPN	SOT–23	45	100
BC856	PNP	SOT–23	65	100
BC857	PNP	SOT–23	45	100
BC858	PNP	SOT–23	30	100
BC859	PNP	SOT–23	30	100
BC860	PNP	SOT–23	45	100
BC868	NPN	SOT–23	20	1000
BC869	PNP	SOT–23	20	1000
BFR54	NPN	TO–92VAR	15	
BFS18	PNP	SOT–23	20	30000
BFS19	PNP	SOT–23	20	30000
BFS20	PNP	SOT–23	20	25000
BFT44	PNP	TO–39(1)	300	500
BFT45	PNP	TO–39(1)	250	500
BFX34	NPN	TO–39(1)	60	2000
BFY50	NPN	TO–39(1)	35	1000
BFY51	NPN	TO–39(1)	30	1000
BFY52	NPN	TO–39(1)	20	1000
BFY55	NPN	TO–39(1)	35	1000
BF198	NPN	TO–92VAR	30	25
BF199	NPN	TO–92VAR	25	25
BF240	NPN	TO–92VAR	40	25
BF241	NPN	TO–92VAR	40	25
BF324	PNP	TO–92VAR	30	25
BF370	NPN	TO–92VAR	15	100
BF420	NPN	TO–92VAR		50
BF421	PNP	TO–92VAR		50
BF422	NPN	TO–92VAR	250	50
BF423	PNP	TO–92VAR	250	50
BF450	PNP	TO–92VAR	40	25
BF451	PNP	TO–92VAR	40	25
BF483	NPN	TO–92VAR	250	50
BF485	NPN	TO–92VAR	300	50

For detailed information on these and other types see Data Handbook S3

type	pol	case	V_{CEO} V	I_C mA
BF487	NPN	TO–92VAR	400	50
BF494	NPN	TO–92VAR	20	30
BF495	NPN	TO–92VAR	30	30
BF496	NPN	TO–92VAR	20	20
BF536	PNP	SOT–23	30	25000
BF550	PNP	SOT–23	40	25000
BF569	PNP	SOT–23	35	30000
BF570	PNP	SOT–23	15	100
BF579	PNP	SOT–23	20	25000
BF620	NPN	SOT–89		50
BF621	PNP	SOT–89		50
BF622	NPN	SOT–89	250	50
BF623	PNP	SOT–89	250	50
BF660	PNP	SOT–23	30	25000
BF767	PNP	SOT–23	30	20
BF820	NPN	SOT–23		50
BF821	PNP	SOT–23		50
BF822	NPN	SOT–23	250	50
BF823	PNP	SOT–23	250	50
BF824	PNP	SOT–23	30	25000
BF840	PNP	SOT–23	40	25000
BF841	PNP	SOT–23	40	25000
BF926	PNP	TO–92VAR	20	25
BF936	PNP	TO–92VAR	20	25
BF939	PNP	TO–92VAR	25	20
BF967	PNP	SOT–37	30	20
BF970	PNP	SOT–37	35	30
BF970A	PNP	SOT–37	35	30
BF979	PNP	SOT–37	20	
BSR12	PNP	SOT–23	15	100
BSR13	NPN	SOT–23	30	800
BSR14	NPN	SOT–23	40	800
BSR15	PNP	SOT–23	40	600
BSR16	PNP	SOT–23	60	600
BSR17	NPN	SOT–23	40	200
BSR17A	NPN	SOT–23	40	200
BSR18	PNP	SOT–23	40	200
BSR18A	PNP	SOT–23	40	200
BSR19	NPN	SOT–23	140	600
BSR19A	NPN	SOT–23	160	600
BSR20	PNP	SOT–23	120	600
BSR20A	PNP	SOT–23	150	600
BSR30	PNP	SOT–89	60	1000
BSR31	PNP	SOT–89	60	1000
BSR32	PNP	SOT–89	80	1000
BSR33	PNP	SOT–89	80	1000
BSR40	NPN	SOT–89	60	1000
BSR41	NPN	SOT–89	60	1000
BSR42	NPN	SOT–89	80	1000

For detailed information on these and other types see Data Handbook S3

type	pol	case	V_{CEO} V	I_C mA
BSR43	NPN	SOT–89	80	1000
BSR50	NPN	TO–92VAR		1000
BSR51	NPN	TO–92VAR		1000
BSR52	NPN	TO–92VAR		1000
BSR60	PNP	TO–92VAR		1000
BSR61	PNP	TO–92VAR		1000
BSR62	PNP	TO–92VAR		1000
BSS38	NPN	TO–92VAR	100	100
BSS50	NPN	TO–39(1)		1000
BSS51	NPN	TO–39(1)		1000
BSS52	NPN	TO–39(1)		1000
BSS60	PNP	TO–39(1)		1000
BSS61	PNP	TO–39(1)		1000
BSS62	PNP	TO–39(1)		1000
BSS63	PNP	SOT–23	100	100
BSS64	NPN	SOT–23	80	100
BSS68	PNP	TO–92VAR	100	100
BST15	PNP	SOT–89	200	1000
BST16	PNP	SOT–89	300	1000
BST39	NPN	SOT–89	350	1000
BST40	NPN	SOT–89	250	100
BST50	NPN	SOT–89		500
BST51	NPN	SOT–89		500
BST52	NPN	SOT–89		500
BST60	PNP	SOT–89		500
BST61	PNP	SOT–89		500
BST62	PNP	SOT–89		500
BSV15–10	PNP	TO–39(1)	40	1000
BSV15–16	PNP	TO–39(1)	40	1000
BSV16–10	PNP	TO–39(1)	60	1000
BSV16–16	PNP	TO–39(1)	60	1000
BSV17–10	PNP	TO–39(1)	80	1000
BSV52	NPN	SOT–23	12	100
BSV64	NPN	TO–39(1)	60	2000
BSW66A	NPN	TO–39(1)	100	1000
BSW67A	NPN	TO–39(1)	120	1000
BSW68A	NPN	TO–39(1)	150	1000
BSX20	NPN	TO–18	15	
BSX45–10	NPN	TO–39(1)	40	1000
BSX45–16	NPN	TO–39(1)	40	1000
BSX46–10	NPN	TO–39(1)	60	1000
BSX46–16	NPN	TO–39(1)	60	1000
BSX47–10	NPN	TO–39(1)	80	1000
BSX59	NPN	TO–39(1)	45	1000
BSX60	NPN	TO–39(1)	30	1000
BSX61	NPN	TO–39(1)	45	1000
MPSA05	NPN	TO–92	60	500
MPSA06	NPN	TO–92	80	500
MPSA13	NPN	TO–92		500
MPSA14	NPN	TO–92		500
MPSA42	NPN	TO–92	300	500

For detailed information on these and other types see Data Handbook S3

type	pol	case	V_{CEO} V	I_C mA
MPSA43	NPN	TO–92	200	500
MPSA55	PNP	TO–92	60	500
MPSA56	PNP	TO–92	80	500
MPSA63	PNP	TO–92		500
MPSA64	PNP	TO–92		500
MPSA92	PNP	TO–92	300	500
MPSA93	PNP	TO–92	200	500
MPS6513	NPN	TO–92	30	100
MPS6514	NPN	TO–92	25	100
MPS6515	NPN	TO–92	25	100
MPS6517	PNP	TO–92	40	100
MPS6518	PNP	TO–92	40	100
MPS6519	PNP	TO–92	25	100
MPS6520	NPN	TO–92	25	100
MPS6521	NPN	TO–92	25	100
MPS6522	PNP	TO–92	25	100
MPS6523	PNP	TO–92	25	100
PH2222	NPN	TO–92VAR	30	800
PH2222A	NPN	TO–92VAR	40	800
PH2369	NPN	TO–92VAR	15	600
PH2907	PNP	TO–92VAR	40	600
PH2907A	PNP	TO–92VAR	60	600
PH5415	PNP	TO–92VAR	200	1000
PH5416	PNP	TO–92VAR	300	1000
PMBTA05	NPN	SOT–23	60	500
PMBTA06	NPN	SOT–23	80	500
PMBTA13	NPN	SOT–23		300
PMBTA14	NPN	SOT–23		300
PMBTA42	NPN	SOT–23	300	500
PMBTA43	NPN	SOT–23	200	500
PMBTA55	PNP	SOT–23	60	500
PMBTA56	PNP	SOT–23	80	500
PMBTA63	PNP	SOT–23		500
PMBTA64	PNP	SOT–23		500
PMBTA92	PNP	SOT–23	300	500
PMBTA93	PNP	SOT–23	200	500
PMBT2222	NPN	SOT–23	30	600
PMBT2222A	NPN	SOT–23	40	600
PMBT2907	PNP	SOT–23	40	600
PMBT2907A	PNP	SOT–23	60	600
PMBT3903	NPN	SOT–23	40	200
PMBT3904	NPN	SOT–23	40	200
PMBT3906	PNP	SOT–23	40	200
PMBT6428	NPN	SOT–23	50	200
PMBT6429	NPN	SOT–23	45	200
PN2222	NPN	TO–92	30	600
PN2222A	NPN	TO–92	40	600
PN2369	NPN	TO–92	15	600
PN2369A	NPN	TO–92	15	600
PN2907	PNP	TO–92	40	600

For detailed information on these and other types see Data Handbook S3

type	pol	case	V_{CEO} V	I_C mA
PN2907A	PNP	TO–92	60	600
PN3439	NPN	TO–92	350	1000
PN3440	NPN	TO–92	250	1000
PN5415	PNP	TO–92	200	1000
PN5416	PNP	TO–92	300	1000
PXT3904	NPN	SOT–89	40	200
PXT3906	PNP	SOT–89	40	200
2N1613	NPN	TO–39(1)		
2N1711	NPN	TO–39(1)		
2N1893	NPN	TO–39(1)	80	500
2N2219	NPN	TO–39(1)	30	800
2N2219A	NPN	TO–39(1)	40	800
2N2222	NPN	TO–18	30	800
2N2222A	NPN	TO–18	40	800
2N2297	NPN	TO–39(1)	35	1000
2N2369	NPN	TO–18	15	
2N2369A	NPN	TO–18	15	200
2N2483	NPN	TO–18	60	
2N2904	PNP	TO–39(1)	40	600
2N2904A	PNP	TO–39(1)	60	600
2N2905	PNP	TO–39(1)	40	600
2N2905A	PNP	TO–39(1)	60	600
2N2906	PNP	TO–18	40	600
2N2906A	PNP	TO–18	60	600
2N2907	PNP	TO–18	40	600
2N2907A	PNP	TO–18	60	600
2N3019	NPN	TO–39(1)	80	1000
2N3020	NPN	TO–39(1)	80	100
2N3053	NPN	TO–39(1)	40	700
2N3903	NPN	TO–92	40	200
2N3904	NPN	TO–92	40	200
2N3905	PNP	TO–92	40	200
2N3906	PNP	TO–92	40	200
2N4030	PNP	TO–39(1)	60	1000
2N4031	PNP	TO–39(1)	80	1000
2N4032	PNP	TO–39(1)	60	1000
2N4033	PNP	TO–39(1)	80	1000
2N4123	NPN	TO–92	30	200
2N4124	NPN	TO–92	25	200
2N4125	PNP	TO–92	30	200
2N4126	PNP	TO–92	25	200
2N4400	NPN	TO–92	40	600
2N4401	NPN	TO–92	40	600
2N4402	PNP	TO–92	40	600
2N4403	PNP	TO–92	40	600
2N5086	PNP	TO–92	50	50
2N5087	PNP	TO–92	50	50
2N5088	NPN	TO–92	30	50
2N5089	NPN	TO–92	25	50
2N5400	PNP	TO–92	120	600
2N5401	PNP	TO–92	150	600
2N5415	PNP	TO–39(1)	200	1000

For detailed information on these and other types see Data Handbook S3

type	pol	case	V_{CEO} V	I_C mA
2N5416	PNP	TO–39(1)	300	1000
2N5550	NPN	TO–92	140	600
2N5551	NPN	TO–92	160	600
2N929	NPN	TO–18(1)	45	30
2N930	NPN	TO–18	45	30

General–purpose Darlingtons

For detailed information on these and other types see Data Handbook S4a

Voltage range	45 to 200 V
Current range	1 to 25 A
D.C. current gain	500 to 1000

I_C A	V_{CEO} V	N–P–N type	P–N–P type	h_{FE}	case
1	45	**BDX42**	**BDX45**	2000	TO–126
	60	**BDX43**	**BDX46**	2000	TO–126
	80	**BDX44**	**BDX47**	2000	TO–126
4	45	**BD675**	**BD676**	750	TO–126
	60	**BD677**	**BD678**	750	TO–126
	80	**BD679**	**BD680**	750	TO–126
	100	**BD681**	**BD682**	750	TO–126
	120	**BD683**	**BD684**	750	TO–126
	60	**BDT61**	**BDT60**	750	TO–220AB*
	80	**BDT61A**	**BDT60A**	750	TO–220AB*
	100	**BDT61B**	**BDT60B**	750	TO–220AB*
	120	**BDT61C**	**BDT60C**	750	TO–220AB*
	60	**TIP110**	**TIP115**	500	TO–220AB
	80	**TIP111**	**TIP116**	500	TO–220AB
	100	**TIP112**	**TIP117**	500	TO–220AB
5	60	**TIP120**	**TIP125**	1000	TO–220AB
	80	**TIP121**	**TIP126**	1000	TO–220AB
	100	**TIP122**	**TIP127**	1000	TO–220AB
6	60	**BD331(S)**	**BD332(S)**	750	SOT–82(SOT–195)
	80	**BD333(S)**	**BD334(S)**	750	SOT–82(SOT–195)
	100	**BD335(S)**	**BD336(S)**	750	SOT–82(SOT–195)
	120	**BD337(S)**	**BD338(S)**	750	SOT–82(SOT–195)
8	45	**BD643**	**BD644**	750	TO–220AB*
	60	**BD645**	**BD646**	750	TO–220AB*
	80	**BD647**	**BD648**	750	TO–220AB*
	100	**BD649**	**BD650**	750	TO–220AB*
	120	**BD651**	**BD652**	750	TO–220AB*
	60	**BDX63**	**BDX62**	1000	TO–3
	80	**BDX63A**	**BDX62A**	1000	TO–3
	100	**BDX63B**	**BDX62B**	1000	TO–3
	120	**BDX63C**	**BDX62C**	1000	TO–3
	200	**BU806**	–	–	TO–220AB*
	180	**BU806A**	–	–	TO–220AB*
	150	**BU807**	–	–	TO–220AB*
	60	**TIP130**	**TIP135**	1000	TO–220AB
	80	**TIP131**	**TIP136**	1000	TO–220AB
	100	**TIP132**	**TIP137**	1000	TO–220AB
10	60	**BDT63**	**BDT62**	1000	TO–220AB*
	80	**BDT63A**	**BDT62A**	1000	TO–220AB*
	100	**BDT63B**	**BDT62B**	1000	TO–220AB*
	120	**BDT63C**	**BDT62C**	1000	TO–220AB*
	60	**TIP140**	**TIP145**	1000	SOT–93
	80	**TIP141**	**TIP146**	1000	SOT–93
	100	**TIP142**	**TIP147**	1000	SOT–93

* also available in F–pack SOT–186 or SOT–199: add suffix **F** to type number

General–purpose Darlingtons (cont.)

For detailed information on these and other types see Data Handbook S4a

I_C A	V_{CEO} V	N–P–N type	P–N–P type	h_{FE}	case
12	60	**BDT65**	**BDT64**	1000	TO–220AB*
	80	**BDT65A**	**BDT64A**	1000	TO–220AB*
	100	**BDT65B**	**BDT64B**	1000	TO–220AB*
	120	**BDT65C**	**BDT64C**	1000	TO–220AB*
	60	**BDV65**	**BDV64**	1000	SOT–93*
	80	**BDV65A**	**BDV64A**	1000	SOT–93*
	100	**BDV65B**	**BDV64B**	1000	SOT–93*
	120	**BDV65C**	**BDV64C**	1000	SOT–93*
	60	**BDX65**	**BDX64**	1000	TO–3
	80	**BDX65A**	**BDX64A**	1000	TO–3
	100	**BDX65B**	**BDX64B**	1000	TO–3
	120	**BDX65C**	**BDX64C**	1000	TO–3
16	80	**BDV67A**	**BDV66A**	1000	SOT–93*
	100	**BDV67B**	**BDV66B**	1000	SOT–93*
	120	**BDV67C**	**BDV66C**	1000	SOT–93*
	150	**BDV67D**	**BDV66D**	1000	SOT–93*
	60	**BDX67**	**BDX66**	1000	TO–3
	80	**BDX67A**	**BDX66A**	1000	TO–3
	100	**BDX67B**	**BDX66B**	1000	TO–3
	120	**BDX67C**	**BDX66C**	1000	TO–3
25	60	**BDX69**	**BDX68**	1000	TO–3
	80	**BDX69A**	**BDX68A**	1000	TO–3
	100	**BDX69B**	**BDX68B**	1000	TO–3
	120	**BDX69C**	**BDX68C**	1000	TO–3

* also available in F–pack SOT–186 or SOT–199: add suffix **F** to type number

L.F. general–purpose power transistors

For detailed information on these and other types see Data Handbook S4a

Voltage range	20 to 150 V
Current range	1 to 15 A
D.C. current gain	15 to 475

I_C A	V_{CEO} V	N–P–N type	P–N–P type	h_{FE}	case
1	40	**BDT29**	**BDT30**	15	TO–220AB*
	60	**BDT29A**	**BDT30A**	15	TO–220AB*
	80	**BDT29B**	**BDT30B**	15	TO–220AB*
	100	**BDT29C**	**BDT30C**	15	TO–220AB*
	45	**BD825**	**BD826**	40	TO–202
	60	**BD827**	**BD828**	40	TO–202
	80	**BD829**	**BD830**	40	TO–202
	40	**TIP29**	**TIP30**	15	TO–220AB
	60	**TIP29A**	**TIP30A**	15	TO–220AB
	80	**TIP29B**	**TIP30B**	15	TO–220AB
	100	**TIP29C**	**TIP30C**	15	TO–220AB
	120	**TIP29D**	**TIP30D**	15	TO–220AB
1.5	45	**BD135**	**BD136**	40	TO–126
	60	**BD137**	**BD138**	40	TO–126
	80	**BD139**	**BD140**	40	TO–126
	45	**BD226**	**BD227**	40	TO–126
	60	**BD228**	**BD229**	40	TO–126
	80	**BD230**	**BD231**	40	TO–126
	45	**BD839**	**BD840**	40	TO–202
	60	**BD841**	**BD842**	40	TO–202
	80	**BD843**	**BD844**	40	TO–202
2	45	**BD233**	**BD234**	40	TO–126
	60	**BD235**	**BD236**	40	TO–126
	80	**BD237**	**BD238**	40	TO–126

* also available in F–pack SOT–186 or SOT–199: add suffix **F** to type number

For detailed information on these and other types see Data Handbook S4a

I_C A	V_{CEO} V	N–P–N type	P–N–P type	h_{FE}	case
3	45	**BD131**	**BD132**	40	TO–126
	45	**BD239**	**BD240**	15	TO–220AB
	60	**BD239A**	**BD240A**	15	TO–220AB
	80	**BD239B**	**BD240B**	15	TO–220AB
	100	**BD239C**	**BD240C**	15	TO–220AB
	20	**BD329**	**BD330**	85	TO–126
	45	**BD933**	**BD934**	40	TO–220AB*
	60	**BD935**	**BD936**	40	TO–220AB*
	80	**BD937**	**BD938**	40	TO–220AB*
	100	**BD939**	**BD940**	40	TO–220AB*
	120	**BD941**	**BD942**	40	TO–220AB*
	40	**BDT31**	**BDT32**	10	TO–220AB*
	60	**BDT31A**	**BDT32A**	10	TO–220AB*
	80	**BDT31B**	**BDT32B**	10	TO–220AB*
	100	**BDT31C**	**BDT32C**	10	TO–220AB*
	40	**TIP31**	**TIP32**	10	TO–220AB
	60	**TIP31A**	**TIP32A**	10	TO–220AB
	80	**TIP31B**	**TIP32B**	10	TO–220AB
	100	**TIP31C**	**TIP32C**	10	TO–220AB
	120	**TIP31D**	**TIP32D**	10	TO–220AB
4	22	**BD433**	**BD434**	85	TO–126
	32	**BD435**	**BD436**	85	TO–126
	45	**BD437**	**BD438**	85	TO–126
5	45	**BD241**	**BD242**	25	TO–220AB
	60	**BD241A**	**BD242A**	25	TO–220AB
	80	**BD241B**	**BD242B**	25	TO–220AB
	100	**BD241C**	**BD242C**	25	TO–220AB
	22	**BD943**	**BD944**	85	TO–220AB*
	32	**BD945**	**BD946**	85	TO–220AB*
	45	**BD947**	**BD948**	85	TO–220AB*
	60	**BD949**	**BD950**	40	TO–220AB*
	80	**BD951**	**BD952**	40	TO–220AB*
	100	**BD953**	**BD954**	40	TO–220AB*
	120	**BD955**	**BD956**	40	TO–220AB*
	60	**BDX35**		45	TO–126
	60**	**BDX36**		45	TO–126
	80	**BDX37**		45	TO–126
6	40	**BDT41**	**BDT42**	15	TO–220AB*
	60	**BDT41A**	**BDT42A**	15	TO–220AB*
	80	**BDT41B**	**BDT42B**	15	TO–220AB*
	100	**BDT41C**	**BDT42C**	15	TO–220AB*

* also available in F–pack SOT–186 or SOT–199: add suffix **F** to type number

** V_{CER}

L.F. general–purpose power transistors (cont.)

For detailed information on these and other types see Data Handbook S4a and S4b

I_C A	V_{CEO} V	N–P–N type	P–N–P type	h_{FE}	case
7	60	**BD719**	**BD720**	20	TO–126
	80	**BD721**	**BD722**	20	TO–126
	100	**BD723**	**BD724**	20	TO–126
	120	**BD725**	**BD726**	20	SOT–32
	150	**BU407**	–	50	TO–220AB*
	200	**BU406**	–	50	TO–220AB*
8	45	**BD201**	**BD202**	30	TO–220AB*
	60	**BD203**	**BD204**	30	TO–220AB*
	80	**BDX77**	**BDX78**	30	TO–220AB*
	45	**BD243**	**BD244**	15	TO–220AB
	60	**BD243A**	**BD244A**	15	TO–220AB
	80	**BD243B**	**BD244B**	15	TO–220AB
	100	**BD243C**	**BD244C**	15	TO–220AB
	60	**BDX91**	**BDX92**	20	TO–3
	80	**BDX93**	**BDX94**	20	TO–3
	100	**BDX95**	**BDX96**	20	TO–3
10	60	**BDT91**	**BDT92**	20	TO–220AB*
	80	**BDT93**	**BDT94**	20	TO–220AB*
	100	**BDT95**	**BDT96**	20	TO–220AB*
	60	**BDV91**	**BDV92**	20	SOT–93
	80	**BDV93**	**BDV94**	20	SOT–93
	100	**BDV95**	**BDV96**	20	SOT–93
	60	**BDY92**	–	30	TO–3
	80	**BDY91**	–	30	TO–3
	100	**BDY90**	–	30	TO–3
	40	**TIP33**	**TIP34**	20	SOT–93
	60	**TIP33A**	**TIP34A**	20	SOT–93
	80	**TIP33B**	**TIP34B**	20	SOT–93
	100	**TIP33C**	**TIP34C**	20	SOT–93
12	120	**BUV27**	–	–	TO–220AB*
	150	**BUV27A**	–	–	TO–220AB*
14	90	**BUV26**	–	–	TO–220AB*
	100	**BUV26A**	–	–	TO–220AB*
15	60	**BDT81**	**BDT82**	50	TO–220AB*
	80	**BDT83**	**BDT84**	50	TO–220AB*
	100	**BDT85**	**BDT86**	50	TO–220AB*
	120	**BDT87**	**BDT88**	50	TO–220AB*
	60	**TIP3055**	**TIP2955**	20	SOT–93

* also available in F–pack SOT–186 or SOT–199: add suffix **F** to type number

High voltage transistors

For detailed information on these and other types see Data Handbook S4b

Voltage range 90 to 700 V
Current range 0.05 to 30 A

I_C A	V_{CEO} V	V_{CBO} V	type	pol	case	remarks
0.05	250	250	**BF469**	NPN	TO–126	
	250	250	**BF470**	PNP	TO–126	
	300	300	**BF471**	NPN	TO–126	
	300	300	**BF472**	PNP	TO–126	
	250	300	**BF583**	NPN	TO–202	
	300	350	**BF585**	NPN	TO–202	
	400	400	**BF587**	NPN	TO–202	
	250	250	**BF869**	NPN	TO–202	
	250	250	**BF870**	PNP	TO–202	
	300	300	**BF871**	NPN	TO–202	
	300	300	**BF872**	PNP	TO–202	
0.1	250	300	**BF419**	NPN	TO–126	
	160	160	**BF457**	NPN	TO–126	
	250	250	**BF458**	NPN	TO–126	
	300	300	**BF459**	NPN	TO–126	
	250	300	**BF819**	NPN	TO–202	
	160	160	**BF857**	NPN	TO–202	
	250	250	**BF858**	NPN	TO–202	
	300	300	**BF859**	NPN	TO–202	
0.3	375		**BU724A**	NPN	TO–126	Darlington
0.5	400	800	**BUX86**	NPN	TO–126	
	450	1000	**BUX87**	NPN	TO–126	
1	250	350	**TIP47**	NPN	TO–220	
	300	400	**TIP48**	NPN	TO–220	
	350	450	**TIP49**	NPN	TO–220	
	400	500	**TIP50**	NPN	TO–220	
1.5	300	730	**BUX99**	NPN	TO–126	
	300	600	**PH13002**	NPN	TO–126	
	400	700	**PH13003**	NPN	TO–126	
2	400	800	**BUW84**	NPN	SOT–82	
	450	1000	**BUW85**	NPN	SOT–82	
	375	500	**BUX79**	NPN	SOT–82	
	400	800	**BUX84**	NPN	TO–220*	
	450	1000	**BUX85**	NPN	TO–220*	
2.5	700	1500	**BU505**	NPN	TO–220	
	700	1500	**BU505D****	NPN	TO–220	
	700	1500	**BU705**	NPN	SOT–93*	

* also available in F–pack SOT–186 or SOT–199: add suffix **F** to type number
** incl. efficiency diode. $V_F < 1.8$ V at $I_F = 2A$

For detailed information on these and other types see Data Handbook S4b

I_C A	V_{CEO} V	V_{CBO} V	type	pol	case	remarks
3.5	400		**BUX46**	NPN	TO–3	
	450		**BUX46A**	NPN	TO–3	
4	300		**BU304F**	NPN	SOT–186	
	400		**BU305F**	NPN	SOT–186	
	300		**MJE13004**	NPN	TO–220	
	400		**MJE13005**	NPN	TO–220	
5	400		**BUS11**	NPN	TO–3	
	450		**BUS11A**	NPN	TO–3	
	400		**BUT11**	NPN	TO–220AB	
	450		**BUT11A**	NPN	TO–220AB	
	450		**BUT11AF**	NPN	SOT–186	
	400		**BUT11F**	NPN	SOT–186	
	400		**BUW11**	NPN	SOT–93	
	450		**BUW11A**	NPN	SOT–93	
	450		**BUW11AF**	NPN	SOT–199	
	400		**BUW11F**	NPN	SOT–199	
	700	1500	**BU506**	NPN	TO–220	
	700	1500	**BU506D***	NPN	TO–220	
	700	1500	**BU506F**	NPN	SOT–186	
	700	1500	**BU506DF**	NPN	SOT–186	
	700	1500	**BU706**	NPN	SOT–93	
	700	1500	**BU706D***	NPN	SOT–93	
	700	1500	**BU706F**	NPN	SOT–199	
	700	1500	**BU706DF**	NPN	SOT–199	
			BU903		SOT–93	
			BU903F		SOT–199	
6	400	850	**BUT18**	NPN	TO–220	
	450	1000	**BUT18A**	NPN	TO–220	
	400	850	**BUT18F**	NPN	SOT–186	
	450	1000	**BUT18AF**	NPN	SOT–186	
	800		**BUY89**	NPN	TO–3	
	375		**BU826**	NPN	SOT–93	
	400		**BU826A**		SOT–93	Darlington

* incl. efficiency diode. $V_F < 1.8$ V at $I_F = 2$ A

High voltage transistors (cont.)

For detailed information on these and other types see Data Handbook S4b

I_C A	V_{CEO} V	V_{CBO} V	type	pol	case
8	400		**BUS12**	NPN	TO–3
	450		**BUS12A**	NPN	TO–3
	300		**BUS22**	NPN	TO–3
	800		**BUV89**	NPN	SOT–93
	400		**BUW12**	NPN	SOT–93
	450		**BUW12A**	NPN	SOT–93
	450		**BUW12AF**	NPN	SOT–199
	400		**BUW12F**	NPN	SOT–199
	300		**BU306F**	NPN	SOT–186
	400		**BU307F**	NPN	SOT–186
	700		**BU508**	NPN	SOT–93
	700		**BU508A**	NPN	SOT–93
	700		**BU508AF**	NPN	SOT–199
	700		**BU508D***	NPN	SOT–93
	700		**BU508DF**	NPN	SOT–199
	300		**MJE13006**	NPN	TO–220
	400		**MJE13007**	NPN	TO–220
9	400		**BUX47**	NPN	TO–3
	450		**BUX47A**	NPN	TO–3
10	400		**BUT12**	NPN	TO–220
	450		**BUT12A**	NPN	TO–220
	200		**BUV28**	NPN	TO–220
	225		**BUV28A**	NPN	TO–220
	225		**BUV28AF**	NPN	SOT–186
	200		**BUV28F**	NPN	SOT–186

* incl. efficiency diode. $V_F < 2.2$ V at $I_F = 4$ A

High voltage transistors (cont.)

For detailed information on these and other types see Data Handbook S4b

I_C A	V_{CEO} V	V_{CBO} V	type	pol	case	remarks
12	400		**BUV90**	NPN	SOT–93	Darlington
	800		**BUX88**	NPN	TO–3	
	700		**BU808**	NPN	TO–3	
	300		**MJE13008**	NPN	TO–220	
	400		**MJE13009**	NPN	TO–220	
15	400		**BUP23B**	NPN	SOT–93	
	450		**BUP23C**	NPN	SOT–93	
	400		**BUS13**	NPN	TO–3	
	450		**BUS13A**	NPN	TO–3	
	300		**BUS23**	NPN	TO–3	
	350		**BUS23A**	NPN	TO–3	
	400		**BUS23B**	NPN	TO–3	
	450		**BUS23C**	NPN	TO–3	
	400		**BUW13**	NPN	SOT–93	
	450		**BUW13A**	NPN	SOT–93	
	450		**BUW13AF**	NPN	SOT–199	
	400		**BUW13F**	NPN	SOT–199	
	400		**BUX48**	NPN	TO–3	
	450		**BUX48A**	NPN	TO–3	
24	450		**ESM3045AV**		SOT–227B	
	450		**ESM3045DV**		SOT–227B	
30	400		**BUS14**	NPN	TO–3	
	450		**BUS14A**	NPN	TO–3	
	400		**BUS24B**	NPN	TO–3	
	450		**BUS24C**	NPN	TO–3	
	450		**BUV98V**		SOT–227B	
	450		**BUV98AV**		SOT–227B	
	400		**BUX98**	NPN	TO–3	
	450		**BUX98A**	NPN	TO–3	
42	450		**ESM4045AV**		SOT–227B	
	450		**ESM4045DV**		SOT–227B	
60	450		**BUV298V**		SOT–227B	
	450		**BUV298AV**		SOT–227B	
	450		**ESM5045DV**		SOT–227B	
84	450		**ESM6045AV**		SOT–227B	
	450		**ESM6045DV**		SOT–227B	

* also available in F–pack SOT–199: add suffix **F** to type number

For detailed information on these and other types see Data Handbook S9

MOSFET N–CHANNEL

technology	case	V_{DS} max V	$R_{DS(on)}$ at Ω	I_D A	type	I_D max A	P_D max W
MOSFET N	SOT–199	50	0.028	29	**BUK426–50A**	30	45
MOSFET N	SOT–199	50	0.030	29	**BUK426–50B**	30	45
MOSFET N	SOT–199	100	0.057	15	**BUK426–100A**	20	45
MOSFET N	SOT–199	100	0.065	15	**BUK426–100B**	19	45
MOSFET N	SOT–199	200	0.16	10	**BUK426–200A**	11	45
MOSFET N	SOT–199	200	0.20	10	**BUK426–200B**	10	45
MOSFET N	SOT–199	800	3	1.5	**BUK426–800A**	2.4	45
MOSFET N	SOT–199	800	4	1.5	**BUK426–800B**	2.1	45
MOSFET N	SOT–199	1000	4	1.5	**BUK426–1000A**	2.1	45
MOSFET N	SOT–199	1000	5	1.5	**BUK426–1000B**	1.9	45
MOSFET N	SOT–199	400	0.4	6.5	**BUK427–400A**	6.9	45
MOSFET N	SOT–199	400	0.5	6.5	**BUK427–400B**	6.2	45
MOSFET N	SOT–199	450	0.6	6.5	**BUK427–450B**	5.6	45
MOSFET N	SOT–199	500	0.6	6.5	**BUK427–500B**	5.6	45
MOSFET N	SOT–199	500	0.8	6.5	**BUK427–500B**	4.8	45
MOSFET N	SOT–199	600	1	6.5	**BUK427–600A**	4.3	45
MOSFET N	SOT–199	600	1.2	6.5	**BUK427–600B**	3.9	45
MOSFET N	SOT–93	50	0.028	29	**BUK436–50A**	50	125
MOSFET N	SOT–93	50	0.033	29	**BUK436–50B**	46	125
MOSFET N	SOT–93	100	0.057	15	**BUK436–100A**	33	125
MOSFET N	SOT–93	100	0.065	15	**BUK436–100B**	31	125
MOSFET N	SOT–93	200	0.16	10	**BUK436–200A**	19	125
MOSFET N	SOT–93	200	0.20	10	**BUK436–200B**	17	125
MOSFET N	SOT–93	800	3	1.5	**BUK436–800A**	4	125
MOSFET N	SOT–93	800	4	1.5	**BUK436–800A**	3.5	125
MOSFET N	SOT–93	1000	4	1.5	**BUK436–1000A**	3.5	125
MOSFET N	SOT–93	1000	5	1.5	**BUK436–1000B**	3.1	125
MOSFET N	SOT–93	400	0.4	6.5	**BUK437–400A**	14	180
MOSFET N	SOT–93	400	0.5	6.5	**BUK437–400A**	12	180
MOSFET N	SOT–93	450	0.6	6.5	**BUK437–450B**	11	180
MOSFET N	SOT–93	500	0.6	6.5	**BUK437–500A**	11	180
MOSFET N	SOT–93	500	0.8	6.5	**BUK437–500B**	10	180
MOSFET N	SOT–93	600	0.8	6.5	**BUK437–600A**	10	180
MOSFET N	SOT–93	600	1	6.5	**BUK437–600B**	9	180

For detailed information on these and other types see Data Handbook S9

MOSFET N–CHANNEL (cont.)

technology	case	V_{DS} max V	$R_{DS(on)}$ at Ω	I_D A	type	I_D max A	P_D max W
MOSFET N	SOT–186	50	0.13	8.5	**BUK442–50A**	10	22
MOSFET N	SOT–186	50	0.15	8.5	**BUK442–50B**	9.2	22
MOSFET N	SOT–186	60	0.13	8.5	**BUK442–60A**	10	22
MOSFET N	SOT–186	60	0.15	8.5	**BUK442–60B**	9.2	22
MOSFET N	SOT–186	100	0.25	5.5	**BUK442–100A**	6.6	22
MOSFET N	SOT–186	100	0.30	5.5	**BUK442–100B**	6.1	22
MOSFET N	SOT–186	50	0.08	9	**BUK443–50A**	13	25
MOSFET N	SOT–186	50	0.10	9	**BUK443–50B**	9	25
MOSFET N	SOT–186	100	0.16	5	**BUK443–100A**	9	25
MOSFET N	SOT–186	100	0.20	5	**BUK443–100B**	8	25
MOSFET N	SOT–186	200	0.40	3.5	**BUK444–200A**	5.3	25
MOSFET N	SOT–186	200	0.50	3.5	**BUK444–200B**	4.7	25
MOSFET N	SOT–186	400	1.50	1.5	**BUK444–400A**	2.7	25
MOSFET N	SOT–186	400	1.80	1.5	**BUK444–400B**	2.4	25
MOSFET N	SOT–186	450	2.30	1.2	**BUK444–450B**	2.1	25
MOSFET N	SOT–186	500	2.30	1.2	**BUK444–500A**	2.1	25
MOSFET N	SOT–186	500	2.80	1.2	**BUK444–500B**	1.9	25
MOSFET N	SOT–186	600	4	1.2	**BUK444–600A**	1.6	25
MOSFET N	SOT–186	600	4.5	1.2	**BUK444–600B**	1.5	25
MOSFET N	SOT–186	800	6	1	**BUK444–800A**	1.4	30
MOSFET N	SOT–186	800	8	1	**BUK444–800B**	1.2	30
MOSFET N	SOT–186	50	0.038	20	**BUK445–50A**	21	30
MOSFET N	SOT–186	50	0.045	20	**BUK445–50B**	20	30
MOSFET N	SOT–186	100	0.080	13	**BUK445–100A**	14	30
MOSFET N	SOT–186	100	0.10	13	**BUK445–100B**	12	30
MOSFET N	SOT–186	200	0.23	7	**BUK445–200A**	7.6	30
MOSFET N	SOT–186	200	0.28	7	**BUK445–200B**	7	30
MOSFET N	SOT–186	400	0.80	2.5	**BUK445–400A**	4	30
MOSFET N	SOT–186	400	1	2.5	**BUK445–400B**	3.8	30
MOSFET N	SOT–186	450	1.3	2.5	**BUK445–450B**	3.1	30
MOSFET N	SOT–186	500	1.3	2.5	**BUK445–500A**	3.1	30
MOSFET N	SOT–186	500	1.5	2.5	**BUK445–500B**	2.9	30
MOSFET N	SOT–186	600	1.6	2.5	**BUK445–600A**	2.8	30
MOSFET N	SOT–186	600	2	2.5	**BUK445–600B**	2.5	30
MOSFET N	SOT–186	800	3	1.5	**BUK446–800A**	2	30
MOSFET N	SOT–186	800	4	1.5	**BUK446–800B**	1.7	30
MOSFET N	SOT–186	1000	4	1.5	**BUK446–1000A**	1.7	30
MOSFET N	SOT–186	1000	5	1.5	**BUK446–1000B**	1.5	30

For detailed information on these and other types see Data Handbook S9

MOSFET N–CHANNEL (cont.)

technology	case	V_{DS} max V	$R_{DS(on)}$ at Ω	I_D A	type	I_D max A	P_D max W
MOSFET N	TO–220AB	50	0.13	8.5	**BUK452–50A**	15	60
MOSFET N	TO–220AB	50	0.15	8.5	**BUK452–50B**	14	60
MOSFET N	TO–220AB	60	0.13	8.5	**BUK452–60A**	15	60
MOSFET N	TO–220AB	60	0.15	8.5	**BUK452–60B**	15	60
MOSFET N	TO–220AB	100	0.25	5.5	**BUK452–100A**	11	60
MOSFET N	TO–220AB	100	0.30	5.5	**BUK452–100B**	10	60
MOSFET N	TO–220AB	50	0.08	10	**BUK453–50A**	22	75
MOSFET N	TO–220AB	50	0.10	10	**BUK453–50B**	20	75
MOSFET N	TO–220AB	100	0.16	5	**BUK453–100A**	14	75
MOSFET N	TO–220AB	100	0.20	5	**BUK453–100B**	13	75
MOSFET N	TO–220AB	200	0.40	3.5	**BUK454–200A**	9.2	90
MOSFET N	TO–220AB	200	0.50	3.5	**BUK454–200B**	8.2	90
MOSFET N	TO–220AB	400	1.50	1.5	**BUK454–400A**	4.6	75
MOSFET N	TO–220AB	400	1.80	1.5	**BUK454–400B**	4.2	75
MOSFET N	TO–220AB	450	2.30	1.5	**BUK454–450B**	3.7	75
MOSFET N	TO–220AB	500	2.30	1.5	**BUK454–500A**	3.7	75
MOSFET N	TO–220AB	500	2.80	1.5	**BUK454–500B**	3.3	75
MOSFET N	TO–220AB	600	4	1.2	**BUK454–600A**	2.8	75
MOSFET N	TO–220AB	600	4.5	1.2	**BUK454–600B**	2.6	75
MOSFET N	TO–220AB	650	4	1.2	**BUK454–650A**	2.8	75
MOSFET N	TO–220AB	800	6	1	**BUK454–800A**	2.6	100
MOSFET N	TO–220AB	800	8	1	**BUK454–800B**	2.2	100
MOSFET N	TO–220AB	50	0.038	20	**BUK455–50A**	41	125
MOSFET N	TO–220AB	50	0.045	20	**BUK455–50B**	38	125
MOSFET N	TO–220AB	100	0.08	13	**BUK455–100A**	26	125
MOSFET N	TO–220AB	100	0.10	13	**BUK455–100B**	23	125
MOSFET N	TO–220AB	200	0.23	7	**BUK455–200A**	14	125
MOSFET N	TO–220AB	200	0.28	7	**BUK455–200B**	13	125
MOSFET N	TO–220AB	400	0.8	2.5	**BUK455–400A**	7.3	100
MOSFET N	TO–220AB	400	1	2.5	**BUK455–400B**	6.5	100
MOSFET N	TO–220AB	450	1.3	2.5	**BUK455–450B**	5.7	100
MOSFET N	TO–220AB	500	1.3	2.5	**BUK455–500A**	5.7	100
MOSFET N	TO–220AB	500	1.5	2.5	**BUK455–500B**	5.3	100
MOSFET N	TO–220AB	600	2	2.5	**BUK455–600A**	4.5	100
MOSFET N	TO–220AB	600	2.5	2.5	**BUK455–600B**	4	100
MOSFET N	TO–220AB	50	0.028	29	**BUK456–50A**	52	150
MOSFET N	TO–220AB	50	0.030	29	**BUK456–50B**	51	150
MOSFET N	TO–220AB	100	0.057	15	**BUK456–100A**	34	150
MOSFET N	TO–220AB	100	0.065	15	**BUK456–100B**	32	150
MOSFET N	TO–220AB	200	0.16	10	**BUK456–200A**	19	150
MOSFET N	TO–220AB	200	0.20	10	**BUK456–200B**	17	150
MOSFET N	TO–220AB	800	3	1.5	**BUK456–800A**	4	125
MOSFET N	TO–220AB	800	4	1.5	**BUK456–800B**	3.5	125
MOSFET N	TO–220AB	1000	4	1.5	**BUK456–1000A**	3.5	125
MOSFET N	TO–220AB	1000	5	1.5	**BUK456–1000B**	3.1	125
MOSFET N	TO–220AB	400	0.4	6.5	**BUK457–400A**	13	150
MOSFET N	TO–220AB	400	0.5	6.5	**BUK457–400B**	11	150
MOSFET N	TO–220AB	450	0.6	6.5	**BUK457–450B**	10	150
MOSFET N	TO–220AB	500	0.6	6.5	**BUK457–500A**	10	150
MOSFET N	TO–220AB	500	0.8	6.5	**BUK457–500B**	9	150
MOSFET N	TO–220AB	600	0.8	6.5	**BUK457–600A**	9	150
MOSFET N	TO–220AB	600	1	6.5	**BUK457–600B**	8	150

For detailed information on these and other types see Data Handbook S9

MOSFET N–CHANNEL (cont.)

technology	case	V_{DS} max V	$R_{DS(on)}$ Ω	at I_D A	type	I_D max A	P_D max W
MOSFET N	SOT–82	50	0.13	8.5	**BUK462–50A**	15	60
MOSFET N	SOT–82	50	0.15	8.5	**BUK462–50B**	14	60
MOSFET N	SOT–82	60	0.13	8.5	**BUK462–60A**	15	60
MOSFET N	SOT–82	60	0.15	8.5	**BUK462–60B**	14	60
MOSFET N	SOT–82	100	0.25	5.5	**BUK462–100A**	11	60
MOSFET N	SOT–82	100	0.30	5.5	**BUK462–100B**	10	60
MOSFET N	SOT–82	50	0.08	10	**BUK463–50A**	22	75
MOSFET N	SOT–82	50	0.10	10	**BUK463–50B**	20	75
MOSFET N	SOT–82	100	0.16	5	**BUK463–100A**	14	75
MOSFET N	SOT–82	100	0.20	5	**BUK463–100B**	13	75
MOSFET N	SOT–82	200	0.40	3.5	**BUK464–200A**	9.1	75
MOSFET N	SOT–82	200	0.50	3.5	**BUK464–200B**	7.5	75
MOSFET N	SOT–82	400	1.50	1.5	**BUK464–400A**	4.2	62.5
MOSFET N	SOT–82	400	1.80	1.5	**BUK464–400B**	3.8	62.5
MOSFET N	SOT–82	450	2.30	1.5	**BUK464–450B**	3.4	62.5
MOSFET N	SOT–82	500	2.20	1.5	**BUK464–500A**	3.4	62.5
MOSFET N	SOT–82	500	2.60	1.5	**BUK464–500B**	3.2	62.5
MOSFET N	SOT–82	600	4	1.2	**BUK464–600A**	2.5	62.5
MOSFET N	SOT–82	600	4.5	1.2	**BUK464–600B**	2.4	62.5
MOSFET N	SOT–82	800	6	1	**BUK464–800A**	2.2	75
MOSFET N	SOT–82	800	8	1	**BUK464–800B**	1.9	75

For detailed information on these and other types see Data Handbook S9

L^{2}FET

technology	case	V_{DS} max V	$R_{DS(on)}$ at Ω	I_D A	type	I_D max A	P_D max W
L^{2}FET	SOT–186	50	0.15	8.5	**BUK542–50A**	9.2	22
L^{2}FET	SOT–186	50	0.18	8.5	**BUK542–50B**	8.4	22
L^{2}FET	SOT–186	60	0.15	8.5	**BUK542–60A**	9.2	22
L^{2}FET	SOT–186	60	0.18	8.5	**BUK542–60B**	8.4	22
L^{2}FET	SOT–186	100	0.28	5.5	**BUK542–100A**	6.3	22
L^{2}FET	SOT–186	100	0.35	5.5	**BUK542–100B**	5.6	22
L^{2}FET	SOT–186	50	0.085	10	**BUK543–50A**	13	25
L^{2}FET	SOT–186	50	0.10	10	**BUK543–50B**	12	25
L^{2}FET	SOT–186	100	0.18	5	**BUK543–100A**	8.3	25
L^{2}FET	SOT–186	100	0.22	5	**BUK543–100B**	7.5	25
L^{2}FET	SOT–186	50	0.042	20	**BUK545–50A**	20	30
L^{2}FET	SOT–186	50	0.055	20	**BUK545–50B**	18	30
L^{2}FET	SOT–186	100	0.085	13	**BUK545–100A**	13	30
L^{2}FET	SOT–186	100	0.11	13	**BUK545–100B**	12	30
L^{2}FET	SOT–186	200	0.23	7	**BUK545–200A**	7.6	30
L^{2}FET	SOT–186	200	0.28	7	**BUK545–200A**	7	30
L^{2}FET	TO–220AB	50	0.15	8.5	**BUK552–50A**	14	60
L^{2}FET	TO–220AB	50	0.18	8.5	**BUK552–50B**	13	60
L^{2}FET	TO–220AB	60	0.15	8.5	**BUK552–60A**	14	60
L^{2}FET	TO–220AB	60	0.18	8.5	**BUK552–60B**	13	60
L^{2}FET	TO–220AB	100	0.28	5.5	**BUK552–100A**	10	60
L^{2}FET	TO–220AB	100	0.35	5.5	**BUK552–100B**	8.5	60
L^{2}FET	TO–220AB	50	0.085	10	**BUK553–50A**	21	75
L^{2}FET	TO–220AB	50	0.10	10	**BUK553–50B**	20	75
L^{2}FET	TO–220AB	100	0.18	6.5	**BUK553–100A**	13	75
L^{2}FET	TO–220AB	100	0.22	6.5	**BUK553–100A**	12	75
L^{2}FET	TO–220AB	120	0.18	6.5	**BUK553–120A**	13	75
L^{2}FET	TO–220AB	200	0.40	3.5	**BUK554–200A**	9.2	90
L^{2}FET	TO–220AB	200	0.50	3.5	**BUK554–200B**	8.2	90
L^{2}FET	TO–220AB	50	0.042	20	**BUK555–50A**	39	125
L^{2}FET	TO–220AB	50	0.055	20	**BUK555–50B**	35	125
L^{2}FET	TO–220AB	100	0.085	13	**BUK555–100A**	25	125
L^{2}FET	TO–220AB	100	0.11	13	**BUK555–100B**	22	125
L^{2}FET	TO–220AB	200	0.23	7	**BUK555–200A**	14	125
L^{2}FET	TO–220AB	200	0.28	7	**BUK555–200B**	13	125
L^{2}FET	SOT–82	50	0.15	8.5	**BUK562–50A**	14	60
L^{2}FET	SOT–82	50	0.18	8.5	**BUK562–50B**	13	60
L^{2}FET	SOT–82	60	0.15	8.5	**BUK562–60A**	14	60
L^{2}FET	SOT–82	60	0.18	8.5	**BUK562–60B**	13	60
L^{2}FET	SOT–82	100	0.28	5.5	**BUK562–100A**	10	60
L^{2}FET	SOT–82	100	0.35	5.5	**BUK562–100B**	8.5	60
L^{2}FET	SOT–82	50	0.085	10	**BUK563–50A**	21	75
L^{2}FET	SOT–82	50	0.10	10	**BUK563–50B**	20	75
L^{2}FET	SOT–82	100	0.18	5	**BUK563–100A**	13	75
L^{2}FET	SOT–82	100	0.22	5	**BUK563–100B**	12	75
L^{2}FET	SOT–82	200	0.40	3.5	**BUK564–200A**	9.1	75
L^{2}FET	SOT–82	200	0.50	3.5	**BUK564–200B**	7.5	75

For detailed information on these and other types see Data Handbook S9

FREDFETS

technology	case	V_{DS} max V	$R_{DS(on)}$ at Ω	I_D A	type	I_D max A	P_D max W
FREDFET	SOT–199	400	0.5	6.5	**BUK627–400A**	6.9	45
FREDFET	SOT–199	400	0.6	6.5	**BUK627–400B**	6.2	45
FREDFET	SOT–199	450	0.65	6.5	**BUK627–450B**	5.6	45
FREDFET	SOT–199	500	0.65	6.5	**BUK627–500A**	5.6	45
FREDFET	SOT–199	500	0.80	6.5	**BUK627–500B**	4.8	45
FREDFET	SOT–199	600	1	6.5	**BUK627–600A**	4.3	45
FREDFET	SOT–199	600	1.20	6.5	**BUK627–600B**	3.9	4.5
FREDFET	SOT–93	400	0.50	6.5	**BUK637–400A**	14	180
FREDFET	SOT–93	400	0.60	6.5	**BUK637–400B**	12	180
FREDFET	SOT–93	450	0.65	6.5	**BUK637–450B**	11	180
FREDFET	SOT–93	500	0.65	6.5	**BUK637–500A**	11	180
FREDFET	SOT–93	500	0.80	6.5	**BUK637–500B**	10	180
FREDFET	SOT–93	500	0.80	6.5	**BUK637–500B**	10	180
FREDFET	SOT–93	600	1	6.5	**BUK637–600A**	9	180
FREDFET	SOT–93	600	1.2	6.5	**BUK637–600B**	7.8	180
FREDFET	TO–220AB	400	0.80	2.5	**BUK655–400A**	7.3	100
FREDFET	TO–220AB	400	1	2.5	**BUK655–400B**	6.5	100
FREDFET	TO–220AB	450	1.3	2.5	**BUK655–450B**	5.7	100
FREDFET	TO–220AB	500	1.3	2.5	**BUK655–500A**	5.7	100
FREDFET	TO–220AB	500	1.5	2.5	**BUK655–500B**	5.3	100
FREDFET	TO–220AB	600	2	2.5	**BUK655–600A**	4.5	100
FREDFET	TO–220AB	600	2.5	2.5	**BUK655–600B**	4	100
FREDFET	TO–220AB	400	0.5	6.5	**BUK657–400A**	13	150
FREDFET	TO–220AB	400	0.6	6.5	**BUK657–400B**	11	150
FREDFET	TO–220AB	450	0.65	6.5	**BUK657–450B**	10	150
FREDFET	TO–220AB	500	0.65	6.5	**BUK657–500A**	10	150
FREDFET	TO–220AB	500	0.80	6.5	**BUK657–500B**	9	150
FREDFET	TO–220AB	600	1	6.5	**BUK657–600A**	8	150
FREDFET	TO–220AB	600	1.2	6.5	**BUK657–600B**	7.1	150

L.F. power: alphanumeric list

For detailed information on these and other types see Data Handbook S4a

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Voltage range	20 to 800 V
Current range	0.05 to 30 A
D.C. current gain	6 to 1500

Note: The following alphanumeric list for L.F. power transistors is presented as two facing pages of related data. Please read across both pages for ratings and characteristics referring to each type number.

			ratings					
type	pol	case	V_{CBO} V	V_{CESM} V	V_{CEO} V	I_C A	P_{tot} W	at T_{mb} °C
BD131	NPN	TO–126	70		45	3	15	60
BD132	PNP	TO–126	45		45	3	15	60
BD135	NPN	TO–126	45		45	1.5	8	70
BD136	PNP	TO–126	45		45	1.5	8	70
BD137	NPN	TO–126	60		60	1.5	8	70
BD138	PNP	TO–126	60		60	1.5	8	70
BD139	NPN	TO–126	100		80	1.5	8	70
BD140	PNP	TO–126	100		80	1.5	8	70
BD201	NPN	TO–220	60		45	8	60	25
BD201F	NPN	SOT–186	60		45	8	28	25
BD202	PNP	TO–220	60		45	8	60	25
BD202F	PNP	SOT–186	60		45	8	28	25
BD203	NPN	TO–220	60		60	8	60	25
BD203F	NPN	SOT–186	60		60	8	28	25
BD204	PNP	TO–220	60		60	8	60	25
BD204F	PNP	SOT–186	60		60	8	28	25
BD226	NPN	TO–126	45		45	1.5	12.5	62
BD227	PNP	TO–126	45		45	1.5	12.5	62
BD228	NPN	TO–126	60		60	1.5	12.5	62
BD229	PNP	TO–126	60		60	1.5	12.5	62
BD230	NPN	TO–126	100		80	1.5	12.5	62
BD231	PNP	TO–126	100		80	1.5	12.5	62
BD233	NPN	TO–126	45		45	2	25	25
BD234	PNP	TO–126	45		45	2	25	25
BD235	NPN	TO–126	60		60	2	25	25
BD236	PNP	TO–126	60		60	2	25	25
BD237	NPN	TO–126	100		80	2	25	25
BD238	PNP	TO–126	100		80	2	25	25
BD239	NPN	TO–220AB	45		45	3	30	25
BD239A	NPN	TO–220AB	60		60	3	30	25
BD239B	NPN	TO–220AB	80		80	3	30	25
BD239C	NPN	TO–220AB	100		100	3	30	25
BD240	PNP	TO–220AB	45		45	3	30	25
BD240A	PNP	TO–220AB	60		60	3	30	25
BD240B	PNP	TO–220AB	80		80	3	30	25
BD240C	PNP	TO–220AB	100		100	3	30	25

L.F. power: alphanumeric list

For detailed information on these and other types see Data Handbook S4a

characteristics								
h_{FE} min	h_{FE} max	at I_C A	f_{hfe} typ MHz	f_T typ MHz	V_{CEsat} max V	at I_C A	at I_B mA	type
40					0.7	2	200	**BD131**
40					0.7	2	200	**BD132**
40	250	0.15		250	0.5	0.5	5	**BD135**
40	250	0.15		75	0.5	0.5	5	**BD136**
40	250	0.15		250	0.5	0.5	5	**BD137**
40	250	0.15		75	0.5	0.5	5	**BD138**
40	250	0.15		250	0.5	0.5	5	**BD139**
40	250	0.15		75	0.5	0.5	5	**BD140**
30			0.025		1	3	300	**BD201**
30			0.025		1	3	300	**BD201F**
30			0.025		1	3	300	**BD202**
30			0.025		1	3	300	**BD202F**
30			0.025		1	3	300	**BD203**
30			0.025		1	3	300	**BD203F**
30			0.025		1	3	300	**BD204**
30			0.025		1	3	300	**BD204F**
40	250	0.15		125	0.8	1	100	**BD226**
40	250	0.15		50	0.8	1	100	**BD227**
40	250	0.15		125	0.8	1	100	**BD228**
40	250	0.15		50	0.8	1	100	**BD229**
40	250	0.15		125	0.8	1	100	**BD230**
40	250	0.15		50	0.8	1	100	**BD231**
40	250	0.15			0.6	1	100	**BD233**
40	250	0.15			0.6	1	100	**BD234**
40	250	0.15			0.6	1	100	**BD235**
40	250	0.15			0.6	1	100	**BD236**
40	250	0.15			0.6	1	100	**BD237**
40	250	0.15			0.6	1	100	**BD238**
15					0.6	1	200	**BD239**
15					0.6	1	200	**BD239A**
15					0.6	1	200	**BD239B**
15					0.6	1	200	**BD239C**
15					0.6	1	200	**BD240**
15					0.6	1	200	**BD240A**
15					0.6	1	200	**BD240B**
15					0.6	1	200	**BD240C**

For detailed information on these and other types see Data Handbook S4a

			ratings					
type	pol	case	V_{CBO} V	V_{CESM} V	V_{CEO} V	I_C A	P_{tot} W	at T_{mb} °C
BD241	NPN	TO–220AB	45		45	5	40	25
BD241A	NPN	TO–220AB	60		60	5	40	25
BD241B	NPN	TO–220AB	80		80	5	40	25
BD241C	NPN	TO–220AB	100		100	5	40	25
BD242	PNP	TO–220AB	45		45	5	40	25
BD242A	PNP	TO–220AB	60		60	5	40	25
BD242B	PNP	TO–220AB	80		80	5	40	25
BD242C	PNP	TO–220AB	100		100	5	40	25
BD243	NPN	TO–220AB	45		45	8	65	25
BD243A	NPN	TO–220AB	60		60	8	65	25
BD243B	NPN	TO–220AB	80		80	8	65	25
BD243C	NPN	TO–220AB	100		100	8	65	25
BD244	PNP	TO–220AB	45		45	8	65	25
BD244A	PNP	TO–220AB	60		60	8	65	25
BD244B	PNP	TO–220AB	80		80	8	65	25
BD244C	PNP	TO–220AB	100		100	8	65	25
BD329	NPN	TO–126	32		20	3	15	45
BD330	PNP	TO–126	32		20	3	15	45
BD331*	NPN	SOT–82	60		60	6	60	25
BD332*	PNP	SOT–82	60		60	6	60	25
BD333*	NPN	SOT–82	80		80	6	60	25
BD334*	PNP	SOT–82	80		80	6	60	25
BD335*	NPN	SOT–82	100		100	6	60	25

* Also available in SOT–194 (SMD version of SOT–82): add suffix **S** to type number

L.F. power: alphanumeric list

For detailed information on these and other types see Data Handbook S4a

characteristics								
h_{FE} min	h_{FE} max	at I_C A	f_{hfe} typ MHz	f_T typ MHz	V_{CEsat} max V	at I_C A	at I_B mA	type
25					1.2	3	600	**BD241**
25					1.2	3	600	**BD241A**
25					1.2	3	600	**BD241B**
25					1.2	3	600	**BD241C**
25					1.2	3	600	**BD242**
25					1.2	3	600	**BD242A**
25					1.2	3	600	**BD242B**
25					1.2	3	600	**BD242C**
15					1.5	6	1000	**BD243**
15					1.5	6	1000	**BD243A**
15					1.5	6	1000	**BD243B**
15					1.5	6	1000	**BD243C**
15					1.5	6	1000	**BD244**
15					1.5	6	1000	**BD244A**
15					1.5	6	1000	**BD244B**
15					1.5	6	1000	**BD244C**
85	375	0.5		130	0.5	2	200	**BD329**
85	375	0.5		100	0.5	2	200	**BD330**
750			0.06	7	2	3	12	**BD331**
750			0.06	7	2	3	12	**BD332**
750			0.06	7	2	3	12	**BD333**
750			0.06	7	2	3	12	**BD334**
750			0.06	7	2	3	12	**BD335**

For detailed information on these and other types see Data Handbook S4a

			ratings					
type	pol	case	V_{CBO} V	V_{CESM} V	V_{CEO} V	I_C A	P_{tot} W	at T_{mb} °C
BD336	PNP	SOT–82	100		100	6	60	25
BD337	NPN	SOT–82	120		120	6	60	25
BD338	PNP	SOT–82	120		120	6	60	25
BD433	NPN	TO–126	22		22	4	36	25
BD434	PNP	TO–126	22		22	4	36	25
BD435	NPN	TO–126	32		32	4	36	25
BD436	PNP	TO–126	32		32	4	36	25
BD437	NPN	TO–126	45		45	4	36	25
BD438	PNP	TO–126	45		45	4	36	25
BD643	NPN	TO–220AB	60		45	8	62.5	25
BD643F	NPN	SOT–186	60		45	8	28	25
BD644	PNP	TO–220AB	45		45	8	62.5	25
BD644F	PNP	SOT–186	45		45	8	28	25
BD645	NPN	TO–220AB	80		60	8	62.5	25
BD645F	NPN	SOT–186	80		60	8	28	25
BD646	PNP	TO–220AB	60		60	8	62.5	25
BD646F	PNP	SOT–186	60		60	8	28	25
BD647	NPN	TO–220AB	100		80	8	62.5	25
BD647F	NPN	SOT–186	100		80	8	28	25
BD648	PNP	TO–220AB	80		80	8	62.5	25
BD648F	PNP	SOT–186	80		80	8	28	25
BD649	NPN	TO–220AB	120		100	8	62.5	25
BD649F	NPN	SOT–186	120		100	8	28	25
BD650	PNP	TO–220AB	100		100	8	62.5	25
BD650F	PNP	SOT–186	100		100	8	28	25
BD651	NPN	TO–220AB	140		120	8	62.5	25
BD651F	NPN	SOT–186	140		120	8	62.5	25
BD652	PNP	TO–220AB	120		120	8	62.5	25
BD652F	PNP	SOT–186	120		120	8	28	25

L.F. power: alphanumeric list

For detailed information on these and other types see Data Handbook S4a

characteristics

h_{FE} min	h_{FE} max	at I_C A	f_{hfe} typ MHz	f_T typ MHz	V_{CEsat} max V	at I_C A	at I_B mA	type
750			0.06	7	2	3	12	**BD336**
750			0.06	7	2	3	12	**BD337**
750			0.06	7	2	3	12	**BD338**
85	475	0.5			0.5	2	200	**BD433**
85	475	0.5			0.5	2	200	**BD434**
85	475	0.5			0.5	2	200	**BD435**
85	475	0.5			0.5	2	200	**BD436**
85	375	0.5			0.7	3	300	**BD437**
85	375	0.5			0.7	3	300	**BD438**
750			0.05		2	3	12	**BD643**
750			0.05		2	3	12	**BD643F**
750			0.1		2	3	12	**BD644**
750			0.1		2	3	12	**BD644F**
750			0.05		2	3	12	**BD645**
750			0.05		2	3	12	**BD645F**
750			0.1		2	3	12	**BD646**
750			0.1		2	3	12	**BD646F**
750			0.05		2	3	12	**BD647**
750			0.05		2	3	12	**BD647F**
750			0.1		2	3	12	**BD648**
750			0.1		2	3	12	**BD648F**
750			0.05		2	3	12	**BD649**
750			0.05		2	3	12	**BD649F**
750			0.1		2	3	12	**BD650**
750			0.1		2	3	12	**BD650F**
750			0.05		2	3	12	**BD651**
750			0.05		2	3	12	**BD651F**
750			0.1		2	3	12	**BD652**
750			0.1		2	3	12	**BD652F**

L.F. power: alphanumeric list

For detailed information on these and other types see Data Handbook S4a

type	pol	case	ratings					
			V_{CBO} V	V_{CESM} V	V_{CEO} V	I_C A	P_{tot} W	at T_{mb} °C
BD675	NPN	TO–126	60		45	4	40	25
BD676	PNP	TO–126	45		45	4	40	25
BD677	NPN	TO–126	80		60	4	40	25
BD678	PNP	TO–126	60		60	4	40	25
BD679	NPN	TO–126	100		80	4	40	25
BD680	PNP	TO–126	80		80	4	40	25
BD681	NPN	TO–126	120		100	4	40	25
BD682	PNP	TO–126	100		100	4	40	25
BD683	NPN	TO–126	140		120	4	40	25
BD684	PNP	TO–126	120		120	4	40	25
BD719	NPN	TO–126	60		60	7	36	25
BD720	PNP	TO–126	60		60	7	36	25
BD721	NPN	TO–126	80		80	7	36	25
BD722	PNP	TO–126	80		80	7	36	25
BD723	NPN	TO–126	100		100	7	36	25
BD724	PNP	TO–126	100		100	7	36	25
BD725	NPN	TO–126	120		120	7	36	25
BD726	PNP	TO–126	120		120	7	36	25
BD825	NPN	TO–202	45		45	1	8	50
BD826	PNP	TO–202	45		45	1	8	50
BD827	NPN	TO–202	60		60	1	8	50
BD828	PNP	TO–202	60		60	1	8	50
BD829	NPN	TO–202	100		80	1	8	50
BD830	PNP	TO–202	100		80	1	8	50
BD839	NPN	TO–202	45		45	1.5	10	25
BD840	PNP	TO–202	45		45	1.5	10	25
BD841	NPN	TO–202	60		60	1.5	10	25
BD842	PNP	TO–202	60		60	1.5	10	25
BD843	NPN	TO–202	100		80	1.5	10	25
BD844	PNP	TO–202	100		80	1,5	10	25

L.F. power: alphanumeric list

For detailed information on these and other types see Data Handbook S4a

characteristics

h_{FE} min	h_{FE} max	at I_C A	f_{hfe} typ MHz	f_T typ MHz	V_{CEsat} max V	at I_C A	at I_B mA	type
750				7	2.5	1.5	6	**BD675**
750				7	2.5	1.5	6	**BD676**
750				7	2.5	1.5	6	**BD677**
750				7	2.5	1.5	6	**BD678**
750				7	2.5	1.5	6	**BD679**
750				7	2.5	1.5	6	**BD680**
750				7	2.5	1.5	6	**BD681**
750				7	2.5	1.5	6	**BD682**
750				7	2.5	1.5	6	**BD683**
750				7	2.5	1.5	6	**BD684**
20				3	1	2.0	0.2	**BD719**
20				3	1	2.0	0.2	**BD720**
20				3	1	2.0	0.2	**BD721**
20				3	1	2.0	0.2	**BD722**
20				3	1	2.0	0.2	**BD723**
20				3	1	2.0	0.2	**BD724**
20				3	1	2.0	0.2	**BD725**
20				3	1	2.0	0.2	**BD726**
40	250	0.15		250	0.5	0.5	50	**BD825**
40	250	0.15		75	0.5	0.5	50	**BD826**
40	250	0.15		250	0.5	0.5	50	**BD827**
40	250	0.15		75	0.5	0.5	50	**BD828**
40	250	0.15		250	0.5	0.5	50	**BD829**
40	250	0.15		75	0.5	0.5	50	**BD830**
40	250	0.15		125	0.8	1.0	100	**BD839**
40	250	0.15		50	0.8	1.0	100	**BD840**
40	250	0.15		125	0.8	1.0	100	**BD841**
40	250	0.15		50	0.8	1.0	100	**BD842**
40	250	0.15		125	0.8	1.0	100	**BD843**
40	250	0.15		50	0.8	1.0	100	**BD844**

L.F. power: alphanumeric list

For detailed information on these and other types see Data Handbooks S4a

			ratings					
type	pol	case	V_{CBO} V	V_{CESM} V	V_{CEO} V	I_C A	P_{tot} W	at T_{mb} °C
BD933	NPN	TO–220AB	45		45	3	30	25
BD933F	NPN	SOT–186	45		45	3	19	25
BD934	PNP	TO–220AB	45		45	3	30	25
BD934F	PNP	SOT–186	45		45	3	19	25
BD935	NPN	TO–220AB	60		60	3	30	25
BD935F	NPN	SOT–186	60		60	3	19	25
BD936	PNP	TO–220AB	60		60	3	30	25
BD936F	PNP	SOT–186	60		60	3	19	25
BD937	NPN	TO–220AB	100		80	3	30	25
BD937F	NPN	SOT–186	100		80	3	19	25
BD938	PNP	TO–220AB	100		80	3	30	25
BD938F	PNP	SOT–186	100		80	3	19	25
BD939	NPN	TO–220AB	120		100	3	30	25
BD939F	NPN	SOT–186	120		100	3	19	25
BD940	PNP	TO–220AB	120		100	3	30	25
BD940F	PNP	SOT–186	120		100	3	19	25
BD941	NPN	TO–220AB	140		120	3	30	25
BD941F	NPN	SOT–186	140		120	3	19	25

For detailed information on these and other types see Data Handbooks S4a

characteristics

h_{FE} min	h_{FE} max	at I_C A	f_{hfe} typ MHz	f_T typ MHz	V_{CEsat} max V	at I_C A	at I_B mA	type
40	250	0.15		3	0.6	1	100	**BD933**
40	250	0.15		3	0.6	1	100	**BD933F**
40	250	0.15		3	0.6	1	100	**BD934**
40	250	0.15		3	0.6	1	100	**BD934F**
40	250	0.15		3	0.6	1	100	**BD935**
40	250	0.15		3	0.6	1	100	**BD935F**
40	250	0.15		3	0.6	1	100	**BD936**
40	250	0.15		3	0.6	1	100	**BD936F**
40	250	0.15		3	0.6	1	100	**BD937**
40	250	0.15		3	0.6	1	100	**BD937F**
40	250	0.15		3	0.6	1	100	**BD938**
40	250	0.15		3	0.6	1	100	**BD938F**
40	250	0.15		3	0.6	1	100	**BD939**
40	250	0.15		3	0.6	1	100	**BD939F**
40	250	0.15		3	0.6	1	100	**BD940**
40	250	0.15		3	0.6	1	100	**BD940F**
40	250	0.15		3	0.6	1	100	**BD941**
40	250	0.15		3	0.6	1	100	**BD941F**

For detailed information on these and other types see Data Handbooks S4a

			ratings					
type	pol	case	V_{CBO} V	V_{CESM} V	V_{CEO} V	I_C A	P_{tot} W	at T_{mb} °C
BD942	PNP	TO–220AB	140		120	3	30	25
BD942F	PNP	SOT–186	140		120	3	19	25
BD943	NPN	TO–220AB	22		22	5	40	25
BD943F	NPN	SOT–186	22		22	5	22	25
BD944	PNP	TO–220AB	22		22	5	40	25
BD944F	PNP	SOT–186	22		22	5	22	25
BD945	NPN	TO–220AB	32		32	5	40	25
BD945F	NPN	SOT–186	32		32	5	22	25
BD946	PNP	TO–220AB	32		32	5	40	25
BD946F	PNP	SOT–186	32		32	5	22	25
BD947	NPN	TO–220AB	45		45	5	40	25
BD947F	NPN	SOT–186	45		45	5	22	25
BD948	PNP	TO–220AB	45		45	5	40	25
BD948F	PNP	SOT–186	45		45	5	22	25
BD949	NPN	TO–220AB	60		60	5	40	25
BD949F	NPN	SOT–186	60		60	5	22	25
BD950	PNP	TO–220AB	60		60	5	40	25
BD950F	PNP	SOT–186	60		60	5	22	25
BD951	NPN	TO–220AB	80		80	5	40	25
BD951F	NPN	SOT–186	80		80	5	22	25
BD952	PNP	TO–220AB	80		80	5	40	25
BD952F	PNP	SOT–186	80		80	5	22	25
BD953	NPN	TO–220AB	100		100	5	40	25
BD953F	NPN	SOT–186	100		100	5	22	25
BD954	PNP	TO–220AB	100		100	5	40	25
BD954F	PNP	SOT–186	100		100	5	22	25
BD955	NPN	TO–220AB	120		120	5	40	25
BD955F	NPN	SOT–186	120		120	5	22	25
BD956	PNP	TO–220AB	120		120	5	40	25
BD956F	PNP	SOT–186	120		120	5	22	25

L.F. power: alphanumeric list

For detailed information on these and other types see Data Handbooks S4a

characteristics

h_{FE} min	h_{FE} max	at I_C A	f_{hfe} typ MHz	f_T typ MHz	V_{CEsat} max V	at I_C A	at I_B mA	type
40	250	0.15		3	0.6	1	100	**BD942**
40	250	0.15		3	0.6	1	100	**BD942F**
85	475	0.5		3	0.5	2	200	**BD943**
85	475	0.5		3	0.5	2	200	**BD943F**
85	475	0.5		3	0.5	2	200	**BD944**
85	475	0.5		3	0.5	2	200	**BD944F**
85	475	0.5		3	0.5	2	200	**BD945**
85	475	0.5		3	0.5	2	200	**BD945F**
85	475	0.5		3	0.5	2	200	**BD946**
85	475	0.5		3	0.5	2	200	**BD946F**
85	475	0.5		3	0.5	2	200	**BD947**
85	475	0.5		3	0.5	2	200	**BD947F**
85	475	0.5		3	0.5	2	200	**BD948**
85	475	0.5		3	0.5	2	200	**BD948F**
40				3	1	2	200	**BD949**
40				3	1	2	200	**BD949F**
40				3	1	2	200	**BD950**
40				3	1	2	200	**BD950F**
40				3	1	2	200	**BD951**
40				3	1	2	200	**BD951F**
40				3	1	2	200	**BD952**
40				3	1	2	200	**BD952F**
40				3	1	2	200	**BD953**
40				3	1	2	200	**BD953F**
40				3	1	2	200	**BD954**
40				3	1	2	200	**BD954F**
40				3	1	2	200	**BD955**
40				3	1	2	200	**BD955F**
40				3	1	2	200	**BD956**
40				3	1	2	200	**BD956F**

L.F. power: alphanumeric list

For detailed information on these and other types see Data Handbooks S4a

			ratings					
type	pol	case	V_{CBO} V	V_{CESM} V	V_{CEO} V	I_C A	P_{tot} W	at T_{mb} °C
BDT29	NPN	TO–220AB	40		40	1	30	25
BDT29A	NPN	TO–220AB	60		60	1	30	25
BDT29AF	NPN	SOT–186	60		60	1	19	25
BDT29B	NPN	TO–220AB	80		80	1	30	25
BDT29BF	NPN	SOT–186	80		80	1	19	25
BDT29C	NPN	TO–220AB	100		100	1	30	25
BDT29CF	NPN	SOT–186	100		100	1	19	25
BDT29F	NPN	SOT–186	40		40	1	19	25
BDT30	PNP	TO–220AB	40		40	1	30	25
BDT30A	PNP	TO–220AB	60		60	1	30	25
BDT30AF	PNP	SOT–186	60		60	1	19	25
BDT30B	PNP	TO–220AB	80		80	1	30	25
BDT30BF	PNP	SOT–186	80		80	1	19	25
BDT30C	PNP	TO–220AB	100		100	1	30	25
BDT30CF	PNP	SOT–186	100		100	1	19	25
BDT30F	PNP	SOT–186	40		40	1	19	25
BDT31	NPN	TO–220AB	40		40	3	40	25
BDT31A	NPN	TO–220AB	60		60	3	40	25
BDT31AF	NPN	SOT–186	60		60	3	19	25
BDT31B	NPN	TO–220AB	80		80	3	40	25
BDT31BF	NPN	SOT–186	80		80	3	19	25
BDT31C	NPN	TO–220AB	100		100	3	40	25
BDT31CF	NPN	SOT–186	100		100	3	19	25
BDT31F	NPN	SOT–186	40		40	3	19	25
BDT32	PNP	TO–220AB	40		40	3	40	25
BDT32A	PNP	TO–220AB	60		60	3	40	25
BDT32AF	PNP	SOT–186	60		60	3	19	25
BDT32B	PNP	TO–220AB	80		80	3	40	25
BDT32BF	PNP	SOT–186	80		80	3	19	25
BDT32C	PNP	TO–220AB	100		100	3	40	25
BDT32CF	PNP	SOT–186	100		100	3	19	25
BDT32F	PNP	SOT–186	40		40	3	19	25
BDT41	NPN	TO–220AB	40		40	6	65	25
BDT41A	NPN	TO–220AB	60		60	6	65	25
BDT41AF	NPN	SOT–186	60		60	6	28	25
BDT41B	NPN	TO–220AB	80		80	6	65	25
BDT41BF	NPN	SOT–186	80		80	6	28	25
BDT41C	NPN	TO–220AB	100		100	6	65	25
BDT41CF	NPN	SOT–186	100		100	6	28	25
BDT41F	NPN	SOT–186	40		40	6	28	25
BDT42	PNP	TO–220AB	40		40	6	65	25
BDT42A	PNP	TO–220AB	60		60	6	65	25
BDT42AF	PNP	SOT–186	60		60	6	28	25
BDT42B	PNP	TO–220AB	80		80	6	65	25
BDT42BF	PNP	SOT–186	80		80	6	28	25
BDT42C	PNP	TO–220AB	100		100	6	65	25
BDT42CF	PNP	SOT–186	100		100	6	28	25
BDT42F	PNP	SOT–186	40		40	6	28	25

L.F. power: alphanumeric list

For detailed information on these and other types see Data Handbooks S4a

characteristics								
h_{FE} min	h_{FE} max	at I_C A	f_{hfe} typ MHz	f_T typ MHz	V_{CEsat} max V	at I_C A	at I_B mA	type
15	75	1			0.7	1	125	**BDT29**
15	75	1			0.7	1	125	**BDT29A**
15	75	1			0.7	1	125	**BDT29AF**
15	75	1			0.7	1	125	**BDT29B**
15	75	1			0.7	1	125	**BDT29BF**
15	75	1			0.7	1	125	**BDT29C**
15	75	1			0.7	1	125	**BDT29CF**
15	75	1			0.7	1	125	**BDT29F**
15	75	1			0.7	1	125	**BDT30**
15	75	1			0.7	1	125	**BDT30A**
15	75	1			0.7	1	125	**BDT30AF**
15	75	1			0.7	1	125	**BDT30B**
15	75	1			0.7	1	125	**BDT30BF**
15	75	1			0.7	1	125	**BDT30C**
15	75	1			0.7	1	125	**BDT30CF**
15	75	1			0.7	1	125	**BDT30F**
10	50	3			1.2	3	375	**BDT31**
10	50	3			1.2	3	375	**BDT31A**
10	50	3			1.2	3	375	**BDT31AF**
10	50	3			1.2	3	375	**BDT31B**
10	50	3			1.2	3	375	**BDT31BF**
10	50	3			1.2	3	375	**BDT31C**
10	50	3			1.2	3	375	**BDT31CF**
10	50	3			1.2	3	375	**BDT31F**
10	50	3			1.2	3	375	**BDT32**
10	50	3			1.2	3	375	**BDT32A**
10	50	3			1.2	3	375	**BDT32AF**
10	50	3			1.2	3	375	**BDT32B**
10	50	3			1.2	3	375	**BDT32BF**
10	50	3			1.2	3	375	**BDT32C**
10	50	3			1.2	3	375	**BDT32CF**
10	50	3			1.2	3	375	**BDT32F**
15	75	3			1.5	6	600	**BDT41**
15	75	3			1.5	6	600	**BDT41A**
15	75	3			1.5	6	600	**BDT41AF**
15	75	3			1.5	6	600	**BDT41B**
15	75	3			1.5	6	600	**BDT41BF**
15	75	3			1.5	6	600	**BDT41C**
15	75	3			1.5	6	600	**BDT41CF**
15	75	3			1.5	6	600	**BDT41F**
15	75	3			1.5	6	600	**BDT42**
15	75	3			1.5	6	600	**BDT42A**
15	75	3			1.5	6	600	**BDT42AF**
15	75	3			1.5	6	600	**BDT42B**
15	75	3			1.5	6	600	**BDT42BF**
15	75	3			1.5	6	600	**BDT42C**
15	75	3			1.5	6	600	**BDT42CF**
15	75	3			1.5	6	600	**BDT42F**

L.F. power: alphanumeric list

For detailed information on these and other types see Data Handbooks S4a

type	pol	case	ratings					
			V_{CBO} V	V_{CESM} V	V_{CEO} V	I_C A	P_{tot} W	at T_{mb} °C
BDT60	PNP	TO–220AB	60		60	4	50	25
BDT60A	PNP	TO–220AB	80		80	4	50	25
BDT60AF	PNP	SOT–186	80		80	4	25	25
BDT60B	PNP	TO–220AB	100		100	4	50	25
BDT60BF	PNP	SOT–186	100		100	4	25	25
BDT60C	PNP	TO–220AB	120		120	4	50	25
BDT60CF	PNP	SOT–186	120		120	4	25	25
BDT60F	PNP	SOT–186	60		60	4	25	25
BDT61	NPN	TO–220AB	60		60	4	50	25
BDT61A	NPN	TO–220AB	80		80	4	50	25
BDT61AF	NPN	SOT–186	80		80	4	25	25
BDT61B	NPN	TO–220AB	100		100	4	50	25
BDT61BF	NPN	SOT–186	100		100	4	25	25
BDT61C	NPN	TO–220AB	120		120	4	50	25
BDT61CF	NPN	SOT–186	120		120	4	25	25
BDT61F	NPN	SOT–186	60		60	4	25	25
BDT62	PNP	TO–220AB	60		60	10	90	25
BDT62A	PNP	TO–220AB	80		80	10	90	25
BDT62AF	PNP	SOT–186	80		80	10	32	25
BDT62B	PNP	TO–220AB	100		100	10	90	25
BDT62BF	PNP	SOT–186	100		100	10	32	25
BDT62C	PNP	TO–220AB	120		120	10	90	25
BDT62CF	PNP	SOT–186	120		120	10	32	25
BDT62F	PNP	SOT–186	60		60	10	32	25
BDT63	NPN	TO–220AB	60		60	10	90	25
BDT63A	NPN	TO–220AB	80		80	10	90	25
BDT63AF	NPN	SOT–186	80		80	10	32	25
BDT63B	NPN	TO–220AB	100		100	10	90	25
BDT63BF	NPN	SOT–186	100		100	10	32	25
BDT63C	NPN	TO–220AB	120		120	10	90	25
BDT63CF	NPN	SOT–186	120		120	10	32	25
BDT63F	NPN	SOT–186	60		60	10	32	25

For detailed information on these and other types see Data Handbooks S4a

characteristics								
h_{FE} min	h_{FE} max	at I_C A	f_{hfe} typ MHz	f_T typ MHz	V_{CEsat} max V	at I_C A	at I_B mA	type
750					2.5	1.5	6	**BDT60**
750					2.5	1.5	6	**BDT60A**
750					2.5	1.5	6	**BDT60AF**
750					2.5	1.5	6	**BDT60B**
750					2.5	1.5	6	**BDT60BF**
750					2.5	1.5	6	**BDT60C**
750					2.5	1.5	6	**BDT60CF**
750					2.5	1.5	6	**BDT60F**
750			0.025		2.5	1.5	6	**BDT61**
750			0.025		2.5	1.5	6	**BDT61A**
750			0.025		2.5	1.5	6	**BDT61AF**
750			0.025		2.5	1.5	6	**BDT61B**
750			0.025		2.5	1.5	6	**BDT61BF**
750			0.025		2.5	1.5	6	**BDT61C**
750			0.025		2.5	1.5	6	**BDT61CF**
750			0.025		2.5	1.5	6	**BDT61F**
1000			0.1		2	3	12	**BDT62**
1000			0.1		2	3	12	**BDT62A**
1000			0.1		2	3	12	**BDT62AF**
1000			0.1		2	3	12	**BDT62B**
1000			0.1		2	3	12	**BDT62BF**
1000			0.1		2	3	12	**BDT62C**
1000			0.1		2	3	12	**BDT62CF**
1000			0.1		2	3	12	**BDT62F**
1000			0.05		2	3	12	**BDT63**
1000			0.05		2	3	12	**BDT63A**
1000			0.05		2	3	12	**BDT63AF**
1000			0.05		2	3	12	**BDT63B**
1000			0.05		2	3	12	**BDT63BF**
1000			0.05		2	3	12	**BDT63C**
1000			0.05		2	3	12	**BDT63CF**
1000			0.05		2	3	12	**BDT63F**

For detailed information on these and other types see Data Handbooks S4a

			ratings					
type	pol	case	V_{CBO} V	V_{CESM} V	V_{CEO} V	I_C A	P_{tot} W	at T_{mb} °C
BDT64	PNP	TO–220AB	60		60	12	125	25
BDT64A	PNP	TO–220AB	80		80	12	125	25
BDT64AF	PNP	SOT–186	80		80	12	36	25
BDT64B	PNP	TO–220AB	100		100	12	125	25
BDT64BF	PNP	SOT–186	100		100	12	36	25
BDT64C	PNP	TO–220AB	120		120	12	125	25
BDT64CF	PNP	SOT–186	120		120	12	36	25
BDT64F	PNP	SOT–186	60		60	12	36	25
BDT65	NPN	TO–220AB	60		60	12	125	25
BDT65A	NPN	TO–220AB	80		80	12	125	25
BDT65AF	NPN	SOT–186	80		80	12	36	25
BDT65B	NPN	TO–220AB	100		100	12	125	25
BDT65BF	NPN	SOT–186	100		100	12	36	25
BDT65C	NPN	TO–220AB	120		120	12	125	25
BDT65CF	NPN	SOT–186	120		120	12	36	25
BDT65F	NPN	SOT–186	60		60	12	36	25
BDT81	NPN	TO–220AB	60		60	15	125	25
BDT81F	NPN	SOT–186	60		60	15	36	25
BDT82	PNP	TO–220AB	60		60	15	125	25
BDT82F	PNP	SOT–186	60		60	15	36	25
BDT83	NPN	TO–220AB	80		80	15	125	25
BDT83F	NPN	SOT–186	80		80	15	36	25
BDT84	PNP	TO–220AB	80		80	15	125	25
BDT84F	PNP	SOT–186	80		80	15	36	25
BDT85	NPN	TO–220AB	100		100	15	125	25
BDT85AF	NPN	SOT–186	100		100	15	36	25
BDT85F	NPN	SOT–186	100		100	15	36	25

For detailed information on these and other types see Data Handbooks S4a

characteristics

h_{FE} min	h_{FE} max	at I_C A	f_{hfe} typ MHz	f_T typ MHz	V_{CEsat} max V	at I_C A	at I_B mA	type
1000					2	5	20	**BDT64**
1000					2	5	20	**BDT64A**
1000					2	5	20	**BDT64AF**
1000					2	5	20	**BDT64B**
1000					2	5	20	**BDT64BF**
1000					2	5	20	**BDT64C**
1000					2	5	20	**BDT64CF**
1000					2	5	20	**BDT64F**
1000					2	5	20	**BDT65**
1000					2	5	20	**BDT65A**
1000					2	5	20	**BDT65AF**
1000					2	5	20	**BDT65B**
1000					2	5	20	**BDT65BF**
1000					2	5	20	**BDT65C**
1000					2	5	20	**BDT65CF**
1000					2	5	20	**BDT65F**
50				10	1	5	500	**BDT81**
50				10	1	5	500	**BDT81F**
50				20	1	5	500	**BDT82**
50				10	1	5	500	**BDT82F**
50				10	1	5	500	**BDT83**
50				10	1	5	500	**BDT83F**
50				20	1	5	500	**BDT84**
50				10	1	5	500	**BDT84F**
50				10	1	5	500	**BDT85**
50				10	1	5	50	**BDT85AF**
50				10	1	5	500	**BDT85F**

L.F. POWER TRANSISTORS AND MODULES (cont.)

L.F. power: alphanumeric list

For detailed information on these and other types see Data Handbooks S4a

			ratings					
type	pol	case	V_{CBO} V	V_{CESM} V	V_{CEO} V	I_C A	P_{tot} W	at T_{mb} °C
BDT86	PNP	TO–220AB	100		100	15	125	25
BDT86AF	PNP	SOT–186	100		100	15	36	25
BDT86F	PNP	SOT–186	100		100	15	36	25
BDT87	NPN	TO–220AB	120		120	15	125	25
BDT87AF	NPN	SOT–186	120		120	15	36	25
BDT87F	NPN	SOT–186	120		120	15	36	25
BDT88	PNP	TO–220AB	120		120	15	125	25
BDT88AF	PNP	SOT–186	120		120	15	36	25
BDT88F	PNP	SOT–186	120		120	15	36	25
BDT91	NPN	TO–220AB	60		60	10	90	25
BDT91F	NPN	SOT–186	60		60	10	32	25
BDT92	PNP	TO–220AB	60		60	10	90	25
BDT92F	PNP	SOT–186	60		60	10	32	25
BDT93	NPN	TO–220AB	80		80	10	90	25
BDT93F	NPN	SOT–186	80		80	10	32	25
BDT94	PNP	TO–220AB	80		80	10	90	25
BDT94F	PNP	SOT–186	80		80	10	32	25
BDT95	NPN	TO–220AB	100		100	10	90	25
BDT95F	NPN	SOT–186	100		100	10	32	25
BDT96	PNP	TO–220AB	100		100	10	90	25
BDT96F	PNP	SOT–186	100		100	10	32	25
BDV64	PNP	SOT–93*	60		60	12	125	25
BDV64A	PNP	SOT–93*	80		80	12	125	25
BDV64B	PNP	SOT–93*	100		100	12	125	25
BDV64C	PNP	SOT–93*	120		120	12	125	25
BDV65	NPN	SOT–93*	60		60	12	125	25
BDV65A	NPN	SOT–93*	80		80	12	125	25
BDV65B	NPN	SOT–93*	100		100	12	125	25
BDV65C	NPN	SOT–93*	120		120	12	125	25

* Also available in F–pack SOT–199: add suffix **F** to type number

L.F. power: alphanumeric list

For detailed information on these and other types see Data Handbooks S4a

characteristics

h_{FE} min	h_{FE} max	at I_C A	f_{hfe} typ MHz	f_T typ MHz	V_{CEsat} max V	at I_C A	at I_B mA	type
50				20	1	5	500	**BDT86**
50				10	1	5	50	**BDT86AF**
50				10	1	5	500	**BDT86F**
50				10	1	5	500	**BDT87**
50				10	1	5	50	**BDT87AF**
50				10	1	5	500	**BDT87F**
50				20	1	5	500	**BDT88**
50				10	1	5	50	**BDT88AF**
50				10	1	5	500	**BDT88F**
20	200	4		4	1	4	400	**BDT91**
20	200	4		4	1	4	400	**BDT91F**
20	200	4		4	1	4	400	**BDT92**
20	200	4		4	1	4	400	**BDT92F**
20	200	4		4	1	4	400	**BDT93**
20	200	4		4	1	4	400	**BDT93F**
20	200	4		4	1	4	400	**BDT94**
20	200	4		4	1	4	400	**BDT94F**
20	200	4		4	1	4	400	**BDT95**
20	200	4		4	1	4	400	**BDT95F**
20	200	4		4	1	4	400	**BDT96**
20	200	4		4	1	4	400	**BDT96F**
1000			0.1		2	5	20	**BDV64**
1000			0.1		2	5	20	**BDV64A**
1000			0.1		2	5	20	**BDV64B**
1000			0.1		2	5	20	**BDV64C**
1000			0.07		2	5	20	**BDV65**
1000			0.07		2	5	20	**BDV65A**
1000			0.07		2	5	20	**BDV65B**
1000			0.07		2	5	20	**BDV65C**

For detailed information on these and other types see Data Handbooks S4a

type	pol	case	ratings					
			V_{CBO} V	V_{CESM} V	V_{CEO} V	I_C A	P_{tot} W	at T_{mb} °C
BDV66A	PNP	SOT–93*	100		80	16	175	25
BDV66B	PNP	SOT–93*	120		100	16	175	25
BDV66C	PNP	SOT–93*	140		120	16	175	25
BDV66D	PNP	SOT–93*	160		150	16	175	25
BDV67A	NPN	SOT–93*	100		80	16	200	25
BDV67B	NPN	SOT–93*	120		100	16	200	25
BDV67C	NPN	SOT–93*	140		120	16	200	25
BDV67D	NPN	SOT–93*	160		150	16	200	25
BDV91	NPN	SOT–93	60		60	10	100	25
BDV92	PNP	SOT–93	60		60	10	100	25
BDV93	NPN	SOT–93	80		80	10	100	25
BDV94	PNP	SOT–93	80		80	10	100	25
BDV95	NPN	SOT–93	100		100	10	100	25
BDV96	PNP	SOT–93	100		100	10	100	25
BDX35	NPN	TO–126	100		60	5	15	75
BDX36	NPN	TO–126	120		60	5	15	75
BDX37	NPN	TO–126	120		80	5	15	75
BDX42	NPN	TO–126	60			1	5	100
BDX43	NPN	TO–126	80			1	5	100
BDX44	NPN	TO–126	100			1	5	100
BDX45	PNP	TO–126	60			1	5	100
BDX46	PNP	TO–126	80			1	5	100
BDX47	PNP	TO–126	100			1	5	100
BDX62	PNP	TO–3	60		60	8	90	25
BDX62A	PNP	TO–3	80		80	8	90	25
BDX62B	PNP	TO–3	100		100	8	90	25
BDX62C	PNP	TO–3	120		120	8	90	25
BDX63	NPN	TO–3	80		60	8	90	25
BDX63A	NPN	TO–3	100		80	8	90	25
BDX63B	NPN	TO–3	120		100	8	90	25
BDX63C	NPN	TO–3	140		120	8	90	25

* Also available in F–pack SOT–199: add suffix **F** to type number

PHILIPS

L.F. power: alphanumeric list

For detailed information on these and other types see Data Handbooks S4a

characteristics								
h_{FE} min	h_{FE} max	at I_C A	f_{hfe} typ MHz	f_T typ MHz	V_{CEsat} max V	at I_C A	at I_B mA	type
1000			0.06		2	10	40	**BDV66A**
1000			0.06		2	10	40	**BDV66B**
1000			0.06		2	10	40	**BDV66C**
1000			0.06		2	10	40	**BDV66D**
1000			0.06		2	10	40	**BDV67A**
1000			0.06		2	10	40	**BDV67B**
1000			0.06		2	10	40	**BDV67C**
1000			0.06		2	10	40	**BDV67D**
20					1	4	400	**BDV91**
20					1	4	400	**BDV92**
20					1	4	400	**BDV93**
20					1	4	400	**BDV94**
20					1	4	400	**BDV95**
20					1	4	400	**BDV96**
45	450	0.5		100	0.9	5	500	**BDX35**
45	450	0.5		100	0.7	5	500	**BDX36**
45	450	0.5		100	0.9	5	500	**BDX37**
2000					1.6	1	4	**BDX42**
2000					1.6	1	1	**BDX43**
2000					1.3	0.5	0.5	**BDX44**
2000					1.6	1	4	**BDX45**
2000					1.6	1	1	**BDX46**
2000					1.3	0.5	0.5	**BDX47**
1000			0.1		2	3	12	**BDX62**
1000			0.1		2	3	12	**BDX62A**
1000			0.1		2	3	12	**BDX62B**
1000			0.1		2	3	12	**BDX62C**
1000			0.1		2	3	12	**BDX63**
1000			0.1		2	3	12	**BDX63A**
1000			0.1		2	3	12	**BDX63B**
1000			0.1		2	3	12	**BDX63C**

For detailed information on these and other types see Data Handbooks S4a and S4b

			ratings					
type	pol	case	V_{CBO} V	V_{CESM} V	V_{CEO} V	I_C A	P_{tot} W	at T_{mb} °C
BDX64	PNP	TO–3	60		60	12	117	25
BDX64A	PNP	TO–3	80		80	12	117	25
BDX64B	PNP	TO–3	100		100	12	117	25
BDX64C	PNP	TO–3	120		120	12	117	25
BDX65	NPN	TO–3	80		60	12	117	25
BDX65A	NPN	TO–3	100		80	12	117	25
BDX65B	NPN	TO–3	120		100	12	117	25
BDX65C	NPN	TO–3	140		120	12	117	25
BDX66	PNP	TO–3	60		60	16	150	25
BDX66A	PNP	TO–3	80		80	16	150	25
BDX66B	PNP	TO–3	100		100	16	150	25
BDX66C	PNP	TO–3	120		120	16	150	25
BDX67	NPN	TO–3	80		60	16	150	25
BDX67A	NPN	TO–3	100		80	16	150	25
BDX67B	NPN	TO–3	120		100	16	150	25
BDX67C	NPN	TO–3	140		120	16	150	25
BDX68	PNP	TO–3	60		60	25	200	25
BDX68A	PNP	TO–3	80		80	25	200	25
BDX68B	PNP	TO–3	100		100	25	200	25
BDX68C	PNP	TO–3	120		120	25	200	25
BDX69	NPN	TO–3	80		60	25	200	25
BDX69A	NPN	TO–3	100		80	25	200	25
BDX69B	NPN	TO–3	120		100	25	200	25
BDX69C	NPN	TO–3	140		120	25	200	25
BDX77	NPN	TO–220	100		80	8	60	25
BDX77F	NPN	SOT–186	100		80	8	28	25
BDX78	PNP	TO–220	80		80	8	60	25
BDX78F	PNP	SOT–186	80		80	8	28	25
BDX91	NPN	TO–3	60		60	8	90	25
BDX92	PNP	TO–3	60		60	8	90	25
BDX93	NPN	TO–3	80		80	8	90	25
BDX94	PNP	TO–3	80		80	8	90	25
BDX95	NPN	TO–3	100		100	8	90	25
BDX96	PNP	TO–3	100		100	8	90	25
BDY90	NPN	TO–3	120		100	10	40	70
BDY91	NPN	TO–3	100		80	10	40	70
BDY92	NPN	TO–3	80		60	10	40	70

L.F. power: alphanumeric list

For detailed information on these and other types see Data Handbooks S4a and S4b

characteristics

h_{FE} min	h_{FE} max	at I_C A	f_{hfe} typ MHz	f_T typ MHz	V_{CEsat} max V	at I_C A	at I_B mA	type
1000			0.08		2	5	20	**BDX64**
1000			0.08		2	5	20	**BDX64A**
1000			0.08		2	5	20	**BDX64B**
1000			0.08		2	5	20	**BDX64C**
1000			0.05		2	5	20	**BDX65**
1000			0.05		2	5	20	**BDX65A**
1000			0.05		2	5	20	**BDX65B**
1000			0.05		2	5	20	**BDX65C**
1000			0.06		2	10	40	**BDX66**
1000			0.06		2	10	40	**BDX66A**
1000			0.06		2	10	40	**BDX66B**
1000			0.06		2	10	40	**BDX66C**
1000			0.05		2	10	40	**BDX67**
1000			0.05		2	10	40	**BDX67A**
1000			0.05		2	10	40	**BDX67B**
1000			0.05		2	10	40	**BDX67C**
1000			0.06		2	20	80	**BDX68**
1000			0.06		2	20	80	**BDX68A**
1000			0.06		2	20	80	**BDX68B**
1000			0.06		2	20	80	**BDX68C**
1000			0.05		2	20	80	**BDX69**
1000			0.05		2	20	80	**BDX69A**
1000			0.05		2	20	80	**BDX69B**
1000			0.05		2	20	80	**BDX69C**
30					1	3	300	**BDX77**
30					1	3	300	**BDX77F**
30					1	3	300	**BDX78**
30					1	3	300	**BDX78F**
20					0.8	3	300	**BDX91**
20					0.8	3	300	**BDX92**
20					0.8	3	300	**BDX93**
20					0.8	3	300	**BDX94**
20					0.8	3	300	**BDX95**
20					0.8	3	300	**BDX96**
30	120	5		70	1	10	1000	**BDY90**
30	120	5		70	1	10	1000	**BDY91**
30	120	5		70	1	10	1000	**BDY92**

L.F. power: alphanumeric list

For detailed information on these and other types see Data Handbooks S4b

			ratings					
type	pol	case	V_{CBO} V	V_{CESM} V	V_{CEO} V	I_C A	P_{tot} W	at T_{mb} °C
BU304F	NPN	SOT–186		600	300	4	18	25
BU305F	NPN	SOT–186		700	400	4	18	25
BU306F	NPN	SOT–186		600	300	8	18	25
BU307F	NPN	SOT–186		700	400	8	18	25
BU406	NPN	TO–220		400	200	7	60	25
BU406F	NPN	SOT–186		400	200	7	18	25
BU407	NPN	TO–220		330	150	7	60	25
BU407F	NPN	SOT–186		330	150	7	18	25
BU505	NPN	TO–220		1500	700	2.5	75	25
BU505D*	NPN	TO–220		1500	700	2.5	75	25
BU506	NPN	TO–220		1500	700	5	100	25
BU506D*	NPN	TO–220		1500	700	5	100	25
BU508	NPN	SOT–93		1500	700	8	125	
BU508A	NPN	SOT–93		1500	700	8	125	
BU508AF	NPN	SOT–199		1500	700	8	125	
BU508D*	NPN	SOT–93		1500	700	8	125	
BU508DF*	NPN	SOT–199		1500	700	8	125	

* incl. efficiency diode

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L.F. POWER TRANSISTORS AND MODULES (cont.)

L.F. power: alphanumeric list

For detailed information on these and other types see Data Handbooks S4b

characteristics								
h_{FE} min	h_{FE} max	at I_C A	t_f max T_{mb} = 95 °C µs	f_T typ MHz	V_{CEsat} max V	at I_C A	at I_B mA	type
8	40	2	0.9		0.6	2	500	**BU304F**
8	40	2	0.9		0.6	2	500	**BU305F**
8	40	5	0.7		1.5	5	1000	**BU306F**
8	40	5	0.7		1.5	5	1000	**BU307F**
50			0.75		1	5	500	**BU406**
			0.75		1	5	500	**BU406F**
50			0.75		1	5	500	**BU407**
			0.75		1	5	500	**BU407F**
2.2		2			5	2	900	**BU505**
2.2		2			5	2	900	**BU505D**
					5	3	1330	**BU506**
					5	3	1330	**BU506D**
					5	4.5	2000	**BU508**
				7	1	4.5	2000	**BU508A**
				7	1	4.5	2000	**BU508AF**
				7	1	4.5	2000	**BU508D**
					1	4.5	2000	**BU508DF**

For detailed information on these and other types see Data Handbooks S4b

type	pol	case	ratings					
			V_{CBO} V	V_{CESM} V	V_{CEO} V	I_C A	P_{tot} W	at T_{mb} °C
BU705	NPN	SOT–93		1500	700	2.5	75	25
BU705F	NPN	SOT–199		1500	700	2.5		
BU706	NPN	SOT–93		1500	700	5	100	25
BU706D*	NPN	SOT–93		1500	700	5	100	25
BU724	NPN	SOT–82		650	375	2	1.5	25
BU724A	NPN	SOT–82		850	400	2	1.5	25
BU806	NPN	TO–220AB	400		200	8	60	25
BU806A	NPN	TO–220AB	400		180	8	60	25
BU806AF	NPN	SOT–186	400		180	8	28	25
BU806F	NPN	SOT–186	400		200	8	28	25
BU807	NPN	TO–220AB	330		150	8	60	25
BU807F	NPN	SOT–186	330		150	8	28	25
BU826	NPN	SOT–93		800	375	6	125	25
BU826A		SOT–93		900	400	6	115	
BUS11	NPN	TO–3		850	400	5	100	25
BUS11A	NPN	TO–3		1000	450	5	100	25
BUS12	NPN	TO–3		850	400	8	125	25
BUS12A	NPN	TO–3		1000	450	8	125	25
BUS13	NPN	TO–3		850	400	15	175	25
BUS13A	NPN	TO–3		1000	450	15	175	25
BUS14	NPN	TO–3		850	400	30	250	25
BUS14A	NPN	TO–3		1000	450	30	250	25

* incl. efficiency diode

L.F. power: alphanumeric list

For detailed information on these and other types see Data Handbooks S4b

characteristics								
h_{FE} min	h_{FE} max	at I_C A	t_f max T_{mb} = 95 °C µs	f_T typ MHz	V_{CEsat} max V	at I_C A	at I_B mA	type
2.2		2		7	5	2	900	**BU705**
2.2		2		7	5	2	900	**BU705F**
					5	3	1330	**BU706**
					5	3	1330	**BU706D**
			1.5		5	0.4	1	**BU724**
			1.5		3	0.3	1	**BU724A**
					1.5	5	50	**BU806**
					1.5	5	50	**BU806A**
					1.5	5	50	**BU806AF**
					1.5	5	50	**BU806F**
					1.5	5	50	**BU807**
				7	1.5	5	50	**BU807F**
			0.6		2	2.5	55	**BU826**
			0.6		2	2.5	55	**BU826A**
			0.8		1.5	3	600	**BUS11**
			0.8		1.5	2.5	500	**BUS11A**
			0.8		1.5	6	1200	**BUS12**
			0.8		1.5	5	1000	**BUS12A**
			0.8		1.5	10	2000	**BUS13**
			0.8		1.5	8	1600	**BUS13A**
			0.8		1.5	20	4000	**BUS14**
			0.8		1.5	16	3200	**BUS14A**

For detailed information on these and other types see Data Handbooks S4b

type	pol	case	ratings					
			V_{CBO} V	V_{CESM} V	V_{CEO} V	I_C A	P_{tot} W	at T_{mb} °C
BUS22	NPN	TO–3		550	300	8	125	25
BUT11	NPN	TO–220AB		850	400	5	100	25
BUT11A	NPN	TO–220AB		1000	450	5	100	25
BUT11AF	NPN	SOT–186		1000	450	5	20	
BUT11F	NPN	SOT–186		850	400	5	20	
BUT12	NPN	TO–220		850	400	10	125	25
BUT12A	NPN	TO–220		1000	450	10	125	25
BUT18	NPN	TO–220		850	400	6	110	25
BUT18A	NPN	TO–220		1000	450	6	125	25
BUT18AF	NPN	SOT–186		850	400	6	110	25
BUT18F	NPN	SOT–186		850	400	6	125	25
BUV26	NPN	TO–220		180	90	14	65	25
BUV26A	NPN	TO–220		200	100	14	65	25
BUV26AF	NPN	SOT–186		200	100	14	65	25
BUV26F	NPN	SOT–186		180	90	14	65	25
BUV27	NPN	TO–220		240	120	12	65	25
BUV27A	NPN	TO–220		300	150	12	65	25
BUV27AF	NPN	SOT–186		300	150	12	65	25
BUV27F	NPN	SOT–186		240	120	12	65	25
BUV28	NPN	TO–220		400	200	10	65	25
BUV28A	NPN	TO–220		450	225	10	65	25
BUV28AF	NPN	SOT–186		450	225	10	65	25
BUV28F	NPN	SOT–186		400	200	10	65	25
BUV89	NPN	SOT–93		1200	800	8	125	25
BUV90	NPN	SOT–93		650	400	12	125	25
BUV98V		SOT–227B		850	450	30	150	25
BUV98AV		SOT–227B		1000	450	30	150	25
BUV298V		SOT–227B		850	450	60	250	25
BUV298AV		SOT–227B		1000	450	60	250	25
BUW11	NPN	SOT–93		850	400	5	100	25
BUW11A	NPN	SOT–93		1000	450	5	100	25
BUW11AF	NPN	SOT–199		1000	450	5	100	25
BUW11F	NPN	SOT–199		850	400	5	100	25
BUW12	NPN	SOT–93		850	400	8	125	25
BUW12A	NPN	SOT–93		1000	450	8	125	25
BUW12AF	NPN	SOT–199		1000	450	8	125	25
BUW12F	NPN	SOT–199		850	400	8	125	25

(1) the value of P_{tot} will differ for the F pack versions; refer to data handbook S4b

For detailed information on these and other types see Data Handbooks S4b

characteristics

h_{FE} min	h_{FE} max	at I_C A	t_f max T_{mb} = 95 °C µs	f_T typ MHz	V_{CEsat} max V	at I_C A	at I_B mA	type
10		6						**BUS22**
30		1	0.8		1.5	3	600	**BUT11**
30		1	0.8		1.5	2.5	500	**BUT11A**
			0.8		1.5	2.5	500	**BUT11AF**
			0.8		1.5	3	600	**BUT11F**
			0.8		1.5	6	1200	**BUT12**
			0.8		1.5	5	1000	**BUT12A**
10		10			1.5	4	0.08	**BUT18**
10		10			1.5	4	0.08	**BUT18A**
10		10			1.5	4	0.08	**BUT18AF**
10		10			1.5	4	0.08	**BUT18F**
					1.5	12	1200	**BUV26**
					1	10	1000	**BUV26A**
					1	10	1000	**BUV26AF**
					1.5	12	1200	**BUV26F**
					1.5	12	1200	**BUV27**
					1	10	1000	**BUV27A**
					1	10	1000	**BUV27AF**
					1.5	12	1200	**BUV27F**
					1.5	6	600	**BUV28**
					1.5	4	400	**BUV28A**
					1.5	4	400	**BUV28AF**
					1.5	6	600	**BUV28F**
				7	1	4.5	2000	**BUV89**
				7	2	10	300	**BUV90**
			0.08		1.5	20	4000	**BUV98V**
			0.08		1.5	16	3200	**BUV98AV**
			0.4		1.2	40	8000	**BUV298V**
			0.4		1.2	32	6400	**BUV298AV**
			0.8		1.5	3	600	**BUW11**
			0.8		1.5	2.5	500	**BUW11A**
			0.8		1.5	2.5	500	**BUW11AF**
			0.8		1.5	3	600	**BUW11F**
			0.8		1.5	6	1200	**BUW12**
			0.8		1.5	5	1000	**BUW12A**
			0.8		1.5	5	1000	**BUW12AF**
			0.8		1.5	6	1200	**BUW12F**

L.F. power: alphanumeric list

For detailed information on these and other types see Data Handbooks S4a and S4b

			ratings					
type	pol	case	V_{CBO} V	V_{CESM} V	V_{CEO} V	I_C A	P_{tot} W	at T_{mb} °C
BUW13	NPN	SOT–93		850	400	15	175	25
BUW13A	NPN	SOT–93		1000	450	15	175	25
BUW13AF	NPN	SOT–199		1000	450	15	175	25
BUW13F	NPN	SOT–199		850	400	15	175	25
BUW84	NPN	SOT–82		800	400	2	50	45
BUW85	NPN	SOT–82		1000	450	2	50	45
BUX46	NPN	TO–3			400	3.5	85	25
BUX46A	NPN	TO–3			450	3.5	85	25
BUX47	NPN	TO–3			400	9	125	25
BUX47A	NPN	TO–3			450	9	125	25
BUX48	NPN	TO–3		850	400	15	175	25
BUX48A	NPN	TO–3		1000	450	15	175	25
BUX84	NPN	TO–220		800	400	2	40	50
BUX84F	NPN	SOT–186		800	400	2	18	
BUX85	NPN	TO–220		1000	450	2	40	50
BUX85F	NPN	SOT–186		1000	450	2	18	
BUX86	NPN	TO–126		800	400	0.5	20	60
BUX87	NPN	TO–126		1000	450	0.5	20	60
BUX88	NPN	TO–3		1200	800	12	160	25
BUX98	NPN	TO–3			400	30	250	25
BUX98A	NPN	TO–3			450	30	250	25
BUX99	NPN	TO–126		730	300	1.5	28	25
BUY89	NPN	TO–3		1500	800	6	80	60
ESM3045AV		SOT–227B		1000	450	24	125	25
ESM3045DV		SOT–227B		600	450	24	125	25
ESM4045AV		SOT–227B		1000	450	42	150	25
ESM4045DV		SOT–227B		600	450	42	150	25
ESM5045DV		SOT–227B		600	450	60	175	25
ESM6045AV		SOT–227B		1000	450	84	250	25
ESM6045DV		SOT–227B		600	450	84	250	25
MJE13004	NPN	TO–220		600	300	4	75	25
MJE13005	NPN	TO–220		700	400	4	75	25
MJE13006	NPN	TO–220		600	300	8	80	25
MJE13007	NPN	TO–220		700	400	8	80	25
MJE13008	NPN	TO–220		600	300	12	100	25
MJE13009	NPN	TO–220		700	400	12	100	25
PH13002	NPN	TO–126		600	300	1.5	28	25
PH13003	NPN	TO–126		700	400	1.5	28	25

(1) the value of P_{tot} will differ for the F–pack versions; refer to Handbook S4b

L.F. power: alphanumeric list

For detailed information on these and other types see Data Handbooks S4a and S4b

characteristics								
h_{FE} min	h_{FE} max	at I_C A	t_f max T_{mb} = 95 °C µs	f_T typ MHz	V_{CEsat} max V	at I_C A	at I_B mA	type
			0.8		1.5	10	2000	**BUW13**
			0.8		1.5	8	1600	**BUW13A**
			0.8		1.5	8	1800	**BUW13AF**
			0.8		1.5	10	2000	**BUW13F**
			1.4	20	0.8	0.3	30	**BUW84**
			1.4	20	0.8	0.3	30	**BUW85**
			0.8		1.5	3	600	**BUX46**
			0.8		1.5	2.5	500	**BUX46A**
			0.8		1.5	6	1200	**BUX47**
			0.8		1.5	5	1000	**BUX47A**
			0.8		1.5	10	2000	**BUX48**
			0.8		1.5	8	1600	**BUX48A**
			1.4	20	1	1	200	**BUX84**
			1.4	20	1	1	200	**BUX84F**
			1.4	20	1	1	200	**BUX85**
			1.4	20	1	1	200	**BUX85F**
			1.3	20	3	0.2	20	**BUX86**
			1.3	20	3	0.2	20	**BUX87**
				7	1	9	4000	**BUX88**
			0.8		1.5	20	4000	**BUX98**
			0.8		1.5	16	3200	**BUX98A**
16		0.05	0.8		2	0.2	20	**BUX99**
2.5		0.0045		7	1	4.5	2000	**BUY89**
			0.5		2	15	300	**ESM3045AV**
			0.5		2	15	300	**ESM3045DV**
			0.5		2	25	500	**ESM4045AV**
			0.5		2	25	500	**ESM4045DV**
			0.5		2	35	700	**ESM5045DV**
			0.5		2	50	1000	**ESM6045AV**
			0.5		2	50	1000	**ESM6045DV**
8	40	2	0.9		0.6	2	500	**MJE13004**
8	40	2	0.9		0.6	2	500	**MJE13005**
8	5		0.7		1.5	5	1000	**MJE13006**
8	40	5	0.7		1.5	5	1000	**MJE13007**
8	40	5	0.7		1.5	8	1600	**MJE13008**
8	40	5	0.7		1.5	8	1600	**MJE13009**
8	40	0.5		4	1	1	250	**PH13002**
8	40	0.5		4	1	1	250	**PH13003**

L.F. power: alphanumeric list

For detailed information on these and other types see Data Handbooks S4a and S4b

type	pol	case	ratings					
			V_{CBO} V	V_{CESM} V	V_{CEO} V	I_C A	P_{tot} W	at T_{mb} °C
TIP110	NPN	TO–220AB	60		60	4	50	25
TIP111	NPN	TO–220AB	80		80	4	50	25
TIP112	NPN	TO–220AB	100		100	4	50	25
TIP115	PNP	TO–220AB	60		60	4	50	25
TIP116	PNP	TO–220AB	80		80	4	50	25
TIP117	PNP	TO–220AB	100		100	4	50	25
TIP29	NPN	TO–220AB	80		40	1	30	25
TIP29A	NPN	TO–220AB	100		60	1	30	25
TIP29B	NPN	TO–220AB	120		80	1	30	25
TIP29C	NPN	TO–220AB	140		100	1	30	25
TIP29D	NPN	TO–220AB	160		120	1	30	25
TIP30	PNP	TO–220AB	80		40	1	30	25
TIP30A	PNP	TO–220AB	100		60	1	30	25
TIP30B	PNP	TO–220AB	120		80	1	30	25
TIP30C	PNP	TO–220AB	140		100	1	30	25
TIP30D	PNP	TO–220AB	160		120	1	30	25
TIP31	NPN	TO–220AB	80		40	3	40	25
TIP31A	NPN	TO–220AB	100		60	3	40	25
TIP31B	NPN	TO–220AB	120		80	3	40	25
TIP31C	NPN	TO–220AB	140		100	3	40	25
TIP31D	NPN	TO–220AB	160		120	3	40	25
TIP32	PNP	TO–220AB	80		40	3	40	25
TIP32A	PNP	TO–220AB	100		60	3	40	25
TIP32B	PNP	TO–220AB	120		80	3	40	25
TIP32C	PNP	TO–220AB	140		100	3	40	25
TIP32D	PNP	TO–220AB	160		120	3	40	25
TIP33	NPN	SOT–93	80		40	10	80	25
TIP33A	NPN	SOT–93	100		60	10	80	25
TIP33B	NPN	SOT–93	120		80	10	80	25
TIP33C	NPN	SOT–93	140		100	10	80	25
TIP34	PNP	SOT–93	80		40	10	80	25
TIP34A	PNP	SOT–93	100		60	10	80	25
TIP34B	PNP	SOT–93	120		80	10	80	25
TIP34C	PNP	SOT–93	140		100	10	80	25
TIP47	NPN	TO–220AB	350		250	1	40	25
TIP48	NPN	TO–220AB	400		300	1	40	25
TIP49	NPN	TO–220AB	450		350	1	40	25
TIP50	NPN	TO–220AB	500		400	1	40	25

L.F. power: alphanumeric list

For detailed information on these and other types see Data Handbooks S4a and S4b

characteristics								
h_{FE} min	h_{FE} max	at I_C A	t_f max T_{mb} = 95 °C µs	f_T typ MHz	V_{CEsat} max V	at I_C A	at I_B mA	type
500		2			2.5	2	8	**TIP110**
500		2			2.5	2	8	**TIP111**
500		2			2.5	2	8	**TIP112**
500		2			2.5	2	8	**TIP115**
500		2			2.5	2	8	**TIP116**
500		2			2.5	2	8	**TIP117**
15	75	1			0.7	1	125	**TIP29**
15	75	1			0.7	1	125	**TIP29A**
15	75	1			0.7	1	125	**TIP29B**
15	75	1			0.7	1	125	**TIP29C**
15	75	1			0.7	1	125	**TIP29D**
15	75	1			0.7	1	125	**TIP30**
15	75	1			0.7	1	125	**TIP30A**
15	75	1			0.7	1	125	**TIP30B**
15	75	1			0.7	1	125	**TIP30C**
15	75	1			0.7	1	125	**TIP30D**
10	50	3			1.2	3	375	**TIP31**
10	50	3			1.2	3	375	**TIP31A**
10	50	3			1.2	3	375	**TIP31B**
10	50	3			1.2	3	375	**TIP31C**
10	50	3			1.2	3	375	**TIP31D**
10	50	3			1.2	3	375	**TIP32**
10	50	3			1.2	3	375	**TIP32A**
10	50	3			1.2	3	375	**TIP32B**
10	50	3			1.2	3	375	**TIP32C**
10	50	3			1.2	3	375	**TIP32D**
20	100	3			1	3	300	**TIP33**
20	100	3			1	3	300	**TIP33A**
20	100	3			1	3	300	**TIP33B**
20	100	3			1	3	300	**TIP33C**
20	100	3			1	3	300	**TIP34**
20	100	3			1	3	300	**TIP34A**
20	100	3			1	3	300	**TIP34B**
20	100	3			1	3	300	**TIP34C**
30	150	0.3			1	1	200	**TIP47**
30	150	0.3			1	1	200	**TIP48**
30	150	0.3			1	1	200	**TIP49**
30	150	0.3			1	1	0.2	**TIP50**

L.F. power: alphanumeric list

For detailed information on these and other types see Data Handbooks S4a and S4b

type	pol	case	ratings					
			V_{CBO} V	V_{CESM} V	V_{CEO} V	I_C A	P_{tot} W	at T_{mb} °C
TIP120	NPN	TO–220AB	60		60	5	65	25
TIP121	NPN	TO–220AB	80		80	5	65	25
TIP122	NPN	TO–220AB	100		100	5	65	25
TIP125	PNP	TO–220AB	60		60	5	65	25
TIP126	PNP	TO–220AB	80		80	5	65	25
TIP127	PNP	TO–220AB	100		100	5	65	25
TIP130	NPN	TO–220AB	60		60	8	70	25
TIP131	NPN	TO–220AB	80		80	8	70	25
TIP132	NPN	TO–220AB	100		100	8	70	25
TIP135	PNP	TO–220AB	60		60	8	70	25
TIP136	PNP	TO–220AB	80		80	8	70	25
TIP137	PNP	TO–220AB	100		100	8	70	25
TIP140	NPN	SOT–93	60		60	10	125	25
TIP141	NPN	SOT–93	80		80	10	125	25
TIP142	NPN	SOT–93	100		100	10	125	25
TIP145	PNP	SOT–93	60		60	10	125	25
TIP146	PNP	SOT–93	80		80	10	125	25
TIP147	PNP	SOT–93	100		100	10	125	25
TIP2955	PNP	SOT–93	100		60	15	100	25
TIP2955T	PNP	TO–220AB	70		60	8	75	25
TIP3055	NPN	SOT–93	100		60	15	100	25
TIP3055T	NPN	TO–220AB	70		60	8	75	25

For detailed information on these and other types see Data Handbooks S4a and S4b

characteristics

h_{FE} min	h_{FE} max	at I_C A	t_f max T_{mb} = 95 °C µs	f_T typ MHz	V_{CEsat} max V	at I_C A	at I_B mA	type
1000		3			2	3	12	**TIP120**
1000		3			2	3	12	**TIP121**
1000		3			2	3	12	**TIP122**
1000		3			2	3	12	**TIP125**
1000		3			2	3	12	**TIP126**
1000		3			2	3	12	**TIP127**
1000		4			2	4	16	**TIP130**
1000		4			2	4	16	**TIP131**
1000		4			2	4	16	**TIP132**
1000		4			2	4	16	**TIP135**
1000		4			2	4	16	**TIP136**
1000		4			2	4	16	**TIP137**
1000		5			2	5	10	**TIP140**
1000		5			2	5	10	**TIP141**
1000		5			2	5	10	**TIP142**
1000		5			2	5	10	**TIP145**
1000		5			2	5	10	**TIP146**
1000		5			2	5	10	**TIP147**
5		10			1.1	4	400	**TIP2955**
5		10			0.8	4	400	**TIP2955T**
5		10			1.1	4	400	**TIP3055**
5		10			0.8	4	400	**TIP3055T**

N–channel junction FETs for amplifiers

For detailed information on these and other types see Data Handbook S5

Voltage range 20 to 50 V

type	ratings			characteristics							case
	$\pm V_{DS}$ V	P_{tot} mW	at T_{amb} °C	$-I_{GSS}$ max nA	I_{DSS} min mA	I_{DSS} max mA	$-V_{(P)GS}$ max V	$\lvert Y_{fs}\rvert$ min f = 1 kHz mA V	C_{rs} typ pF	F typ dB	
BC264A	30	300	25	10	2	4.5		2.5	1.2	0.5	TO–92VAR
BC264B	30	300	25	10	3.5	6.5		3	1.2	0.5	TO–92VAR
BC264C	30	300	25	10	5	8		3.5	1.2	0.5	TO–92VAR
BC264D	30	300	25	10	7	12		4	1.2	0.5	TO–92VAR
BFR101A**	30	200	60	5	0.2	1.5	1	1.2			SOT–143
BFR101B**	30	200	60	5	1	5	2.5	2.5			SOT–143
BFR30**	25	250	65	0.2	4	10	5	1			SOT–23
BFR31**	25	250	65	0.2	1	5	2.5	1.5			SOT–23
BFT46**	25	250	65	0.2	0.2	1.5	1.2	1			SOT–23
BFW10	30	300	25	0.1	8	20	8	3.5	0.6	2.5*	TO–72(1)
BFW11	30	300	25	0.1	4	10	6	3	0.6	2.5*	TO–72(1)
BFW12	30	150	110	0.1	1	5	2.5	2			TO–72(1)
BFW13	30	150	110	0.1	0.2	1.5	1.2	1			TO–72(1)
BFW61	25	300	25	1	2	20	8	2			TO–72(1)
BF245A	30	300	75	5	2	6.5	8	3	1.1	1.5	TO–92VAR
BF245B	30	300	75	5	6	15	8	3	1.1	1.5	TO–92VAR
BF245C	30	300	75	5	12	25	8	3	1.1	1.5	TO–92VAR
BF247A	25	250	75	5	30	80	14.5	8	3.5		TO–92VAR
BF247B	25	250	75	5	60	140	14.5	8	3.5		TO–92VAR
BF247C	25	250	75	5	110	250	14.5	8	3.5		TO–92VAR
BF256A	30	300	75	5	3	7		4.5	0.7	7.5	TO–92VAR
BF256B	30	300	75	5	6	13		4.5	0.7	7.5	TO–92VAR
BF256C	30	300	75	5	11	18		4.5	0.7	7.5	TO–92VAR
BF410A	20***	300	75	10	0.7	3		2.5	0.3	1.5	TO–92VAR
BF410B	20***	300	75	10	2.5	7		4	0.3	1.5	TO–92VAR
BF410C	20***	300	75	10	6	12		6	0.3	1.5	TO–92VAR
BF410D	20***	300	75	10	10	18		7	0.3	1.5	TO–92VAR
BF510**	20	250	65	10	0.7	3		2.5	0.3	1.5	SOT–23
BF511**	20	250	65	10	2.5	7		4	0.3	1.5	SOT–23
BF512**	20	250	65	10	6	12		6	0.3	1.5	SOT–23
BF513**	20	250	65	10	10	18		7	0.3	1.5	SOT–23
2N3822	50	300	25	0.1	2	10	6	3		5*	TO–72(1)
2N3823	30	300	25	0.5	4	20	8	3.5		2.5*	TO–72(1)

* maximum value

** surface mounting devices; see page S146

*** asymmetrical

P–channel junction FETs for switching

For detailed information on these and other types see Data Handbook S5

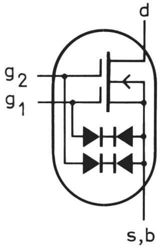
Voltage range 30 V

	ratings			characteristics								
type	$\pm V_{DS}$ V	P_{tot} at mW	T_{amb} °C	I_{GSS} max nA	$-I_{DSS}$ min mA	$-I_{DSS}$ max mA	$V_{GS(off)}$ max V	R_{DSon} max Ω	C_{rs} typ pF	t_{on} ns	t_{off} ns	case
BSJ174	30	400	25	1	20	135	10	85	4	7	15	TO–92
BSJ175	30	400	25	1	7	70	6	125	4	15	30	TO–92
BSJ176	30	400	25	1	2	35	4	250	4	35	35	TO–92
BSJ177	30	400	25	1	1.5	20	2.25	300	4	45	45	TO–92
BSR174*	30	300	50	1	20	135	10	85	4	7	15	SOT–23
BSR175*	30	300	50	1	7	70	6	125	4	15	30	SOT–23
BSR176*	30	300	50	1	2	35	4	250	4	35	35	SOT–23
BSR177*	30	300	50	1	1.5	20	2.25	300	4	45	45	SOT–23

* surface mounting devices; see page S146

Dual–gate n–channel MOS FETs

For detailed information on these and other types see Data Handbook S5



	ratings			characteristics						
type*	V_{DS} V	P_{tot} at mW	T_{amb} °C	I_{DSS} mA	$-V_{(P)GS}$ $-V_{(P)G1-S}$ V	C_{ig1-s} f = 1 MHz pF (typ)	$\|y_{fs}\|$ f = 1 kHz min mS	F max dB	at freq. MHz	case
BF960	20	225	75	2–20	< 3.5	1.8	9.5	2.8***	800	SOT–103
BF964	20	225	75	2–20	< 2.5	2.5	15	2.8	200	SOT–103
BF964S	20	225	75	4–20	< 2.5	2.5	15	1.0***	200	SOT–103
BF966	20	225	75	2–20	< 2.5	2.2	15	3.9	800	SOT–103
BF966S	20	225	75	4–20	< 2.5	2.3	15	1.8***	800	SOT–103
BF980	18	225	75	–	< 1.3	2.6	17	2.8***	800	SOT–103
BF981	20	225	75	4–25	< 2.5	2.1	10	2.0	200	SOT–103
BF982	20	225	75	–	< 1.3	4.0	20	1.2***	200	SOT–103
BF989**	20	200	60	2–20	< 2.7	1.8	9.5	2.8***	800	SOT–143
BF990**	18	200	60	–	< 1.3	3.0	17	2.8***	800	SOT–143
BF991**	20	200	60	4–25	< 2.5	2.1	10	2.0	200	SOT–143
BF992**	20	200	60	–	< 1.3	4.0	20	1.2***	200	SOT–143
BF994**	20	200	60	2–20	< 2.5	2.5	15	2.8	200	SOT–143
BF994S**	20	300	25	4–20	< 2.5	–	15	1.0***	200	SOT–143
BF996**	20	200	60	2–20	< 2.5	2.2	15	3.9	800	SOT–143
BF996S**	20	300	25	4–20	< 2.5	–	15	1.8***	800	SOT–143
BFR84	20	300	25	20–55	1.5–3.8	5.5	12	3.0	200	TO–72

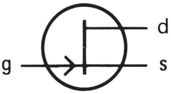
* all types protected against excessive input voltage surges

** surface mounting devices; see page S146

*** typical

N–channel junction FETs for switching

For detailed information on these and other types see Data Handbook S5



Status = P

	ratings			characteristics							
type	$\pm V_{DS}$ V	P_{tot} mW	at T_{amb} °C	$-I_{GSS}$ (I_{SGO}) max pA	I_{DSS} min mA	$-V_{(P)GS}$ max V	R_{DSon} max Ω	C_{rs} max pF	t_{on} max ns	t_{off} max ns	case
BSR56*	40	250	65	1000	50	10	25	5	9	25	SOT–23
BSR57*	40	250	65	1000	20	6	40	5	10	50	SOT–23
BSR58*	40	250	65	1000	8	4	60	5	20	100	SOT–23
BSV78	40	350	25	250	50	11	25	5	10	10	TO–18
BSV79	40	350	25	250	20	7	40	5	18	16	TO–18
BSV80	40	350	25	250	10	5	60	5	30	32	TO–18
PMBF4391*	40	250	65	1000	50	10	30	3.5	15	20	SOT–23
PMBF4392*	40	250	65	1000	25	5	60	3.5	15	35	SOT–23
PMBF4393*	40	250	65	1000	5	3	100	3.5	15	50	SOT–23
2N3966	30	300	25	100	2	6	220	1.5	120	100	TO–72(1)
2N4091	40	1800	25		30	10	30	5	25	40	TO–18
2N4092	40	1800	25		15	7	50	5	35	60	TO–18
2N4093	40	1800	25		8	5	80	5	60	80	TO–18
2N4391	40	1800	25	100	50	10	30	3.5	15	20	TO–18
2N4392	40	1800	25	100	25	5	60	3.5	15	35	TO–18
2N4393	40	1800	25	100	5	3	100	3.5	15	50	TO–18
2N4856	40	360	25	250	50	10	25	8	9	25	TO–18
2N4857	40	360	25	250	20	6	40	8	10	50	TO–18
2N4858	40	360	25	250	8	4	60	8	20	100	TO–18
2N4859	30	360	25	250	50	10	25	8	9	25	TO–18
2N4860	30	360	25	250	20	6	40	8	10	50	TO–18
2N4861	30	360	25	250	8	4	60	8	20	100	TO–18

* surface mounting devices; see page S146

N–channel MOS FETs for switching

For detailed information on these and other types see Data Handbook S5

Voltage range 10 to 20 V

N–channel MOS FETs for switching
Status = P

	ratings			characteristics							mode	
type	V_{DS} V	P_{tot} mW	at T_{amb} °C	$\pm I_{GSS}$ max nA	I_{DSX} I_{SDX} max nA	$r_{ds\ on}$ I_D = 1 mA max Ω	$-V_{(P)GS}$ max V	t_{on} typ ns	t_{off} typ ns	C_{rss} typ pF		case
BFR29	15	200	25	0.01			4			< 0.7	DEPL	TO–72
BSD10(2)	10	275	25		1	30	2	1	5	0.6	DEPL	TO–72(1)
BSD12(2)	20	275	25		1	30	2	1	5	0.6	DEPL	TO–72(1)
BSD20(2)**	10	230	25		1	30	2	1	5	0.6	DEPL	SOT–143
BSD212	10	275	25		1	45		1	5	0.6	ENH	TO–72(1)
BSD213(2)	10	275	25		1	45		1	5	0.6	ENH	TO–72(1)
BSD214	20	275	25		1	45		1	5	0.6	ENH	TO–72(1)
BSD215(2)	20	275	25		1	45		1	5	0.6	ENH	TO–72(1)
BSD22(2)**	20	230	25		1	30	2	1	5	0.6	DEPL	SOT–143
BSS83(2)	10	230	25		1	45*		1	5	0.6	ENH	SOT–143
BSV81	30	200	25	0.01	1	100				0.5	DEPL	TO–72

* I_D = 0.1 mA
** surface mounting devices; see page S146
(2) protection

PHILIPS

P– and N–channel D–MOS FETs for switching

For detailed information on these and other types see Data Handbook S5

Voltage range 50 to 450 V

N–channel vertical D–MOS FETs for switching
Status = P

	ratings				characteristics						
type	V_{DS} V	I_D mA	P_{tot} mW	at T_{amb} °C	$V_{GS(th)}$ min V	$V_{GS(th)}$ max V	C_{is} typ pF	R_{DSon} max Ω	t_{on} max ns	t_{off} max ns	case
BST70A	80	500	1000	25	1.5	3.5	60	4	10	15	TO–92VAR
BST72A	80	300	850	25	1.5	3.5	15	10	10	10	TO–92VAR
BST74A	200	250	1000	25	0.8	2.8	70	12	10	25	TO–92VAR
BST76A	180	300	1000	25	0.7	2.4	65	10	10	15	TO–92VAR
BST80**	80	500	1000	25	1.5	3.5	60	4	10	15	SOT–89
BST82**	80	175	300	25	1.5	3.5	15	10	10	10	SOT–23
BST84**	200	250	1000	25	0.8	2.8	70	12	10	25	SOT–89
BST86**	180	300	1000	25	0.7	2.4	65	10	10	15	SOT–89
BS107	200	120	250	75	0.8	2.8	70	28	10	25	TO–92VAR
BS107A	200	120			0.8	2.8		28	10	15	TO–92VAR
BS170	60	500	830	25	0.8	3.0	25	5	10	10	TO–92VAR
PH6659	35	750	1000	25	0.8	2.0	50	5	10	10	TO–92VAR
PH6660	60	500	1000	25	0.8	2.0	50	5	10	10	TO–92VAR
PH6661	90	500	1000	25	0.8	2.0	50	5.3	10	10	TO–92VAR
2N6659	35	1400	6250	25*	0.8	2.0	50	5	10	10	TO–39(3)
2N6660	60	1100	6250	25*	0.8	2.0	50	5	10	10	TO–39(3)
2N6661	90	900	6250	25*	0.8	2.0	50	5.3	10	10	TO–39(3)
BSS89	200	300	1000	25	0.8	2.8	110	6	80	145	TO–92VAR
BSN254A	240	300	1000	25	0.8	2.0	65	6	5	10	TO–92
BSS87	200	300	1000	25	0.8	2.8	110	6	80	145	SOT–89
PMBF170	60	500	300	25	0.8	3.0	25	5	4	4	SOT–23
BSS91	200	300	1000	25	0.8	2.8	110	6	80	145	TO–18

P–channel vertical D–MOS FETs for switching
Status = P

	ratings				characteristics					
type	$-V_{DS}$ V	$-I_D$ mA	P_{tot} mW	at T_{amb} °C	$V_{GS(th)}$ min V	$V_{GS(th)}$ max V	R_{DSon} max Ω	t_{on} max ns	t_{off} max ns	case
BST100	60	300	1000	25	1.5	3.5	6	4	20	TO–92VAR
BST110	50	250	830	25	1.5	3.5	10	4	10	TO–92VAR
BST120**	60	300	1000	25	1.5	3.5	6	4	20	SOT–89
BST122**	50	250	1000	25	1.5	3.5	10	4	10	SOT–89
BS250	45	250	830	25	1	3.5	14	4	10	TO–92VAR
BSS92	200	150	1000	25	0.8	2.8	20	20	50	TO–92VAR
BSS192	200	150	1000	25	0.8	2.8	20	20	50	SOT–89
BSP254A	250	150	1000	25	0.8	2.8	15	20	50	TO–92VAR
BSP304A	300	150	1000	25	0.8	2.8	20	20	50	TO–92VAR
BSP204A	200	150	1000	25	0.8	2.8	10	20	50	TO–92VAR

* at T_{case}
** surface mounting devices; see page S146

Dual N–channel junction FETs for differential amplifiers

For detailed information on these and other types see Data Handbook S5

Note: BFQ..types: dual transistors in TO–71(1)
BFS..types: matched pairs in SOT–52

Status = P

	ratings			characteristics							
	individual transistor		total device	individual transistor			total device				
type	$\pm V_{DS}$ V	P_{tot} (T_{amb}) mW (°C)	P_{tot} (T_{amb}) mW (°C)	$-I_{GSS}$ max nA	I_{DSS} mA	$-V_{(P)GS}$ max V	$\left\lvert \Delta V_{GS} \right\rvert$ max mV	$\left\lvert \frac{d\Delta V_{GS}}{dT} \right\rvert$ max µV/K	$\left\lvert \Delta \frac{1}{g_{fs}} \right\rvert$ max Ω	$\left\lvert \Delta \frac{g_{os}}{g_{fs}} \right\rvert$ max µV/V	CMRR min dB
BFQ12							10	10	12	30	90
BFQ13							10	20	12	30	90
BFQ14							15	20	12	30	90
BFQ15							20	40	20	30	90
BFQ16							50	50	30	100	80
BFS21	30	300 (25)	30 (100)	0.5	> 1	6	20	75	15	1000	60
BFS21A							10	40	7.5	500	66

For detailed information on these and other types see Data Handbook S6

Main r.f. power application areas with applicable transistors and modules, grouped according to voltage and (within each voltage group) arranged in order of increasing power.

Status = C

application	P_L (P.E.P) W	V_{CE} V	Gp dB	type	case
s.s.b. class–AB; f = 28 MHz **d_3; d_5 < −30 dB**	10	13.5	18	**BLY88A**	SOT–48/2
	10	13.5	18	**BLY88C**	SOT–120
	10	13.5	18	**BLV11**	SOT–123
	15	13.5	18	**BLY89A**	SOT–56
	15	13.5	18	**BLY89C**	SOT–120
	15	13.5	18	**BLW87**	SOT–123
	30	12.5	18	**BLW60**	SOT–56
	30	12.5	18	**BLW60C**	SOT–120
	30	12.5	18	**BLW85**	SOT–123
	80	12.5	12.5	**BLW99**	SOT–121
	10	28	20	**BLY92A**	SOT–48/2
	10	28	20	**BLY92C**	SOT–120
	10	28	20	**BLV21**	SOT–123
	25	28	18	**BLX13**	SOT–56
	25	28	18	**BLX13C**	SOT–120
	25	28	18	**BLW83**	SOT–123
	40	28	17	**BLX39**	SOT–120
	45	28	17	**BLW86**	SOT–123
	50	28	13	**BLX14**	SOT–55
	80			**BLF146**	SOT–121
	80	28	13	**BLW76**	SOT–121
	100	28	19	**BLW78**	SOT–121
	130	28	12	**BLW77**	SOT–121
	175	28	11.5	**BLW97**	SOT–121
	50	50	18	**BLW50F**	SOT–123
	150	50	14	**BLX15**	SOT–55
	160	50	14	**BLW95**	SOT–121
	200	50	13.5	**BLW96**	SOT–121

For detailed information on these and other types see Data Handbook S6

Status = C

application	P_L (P.E.P) W	V_{CE} V	Gp dB	type	case
s.s.b. class–A; **f = 28 MHz;** **d_3; d_5 < −40 dB**	1	12	18	**BLY87A**	SOT–48/2
	1	12	18	**BLY87C**	SOT–120
	1	12	10.5	**BLV10**	SOT–123
	2	12	18	**BLY88A**	SOT–48/2
	2	12	18	**BLY88C**	SOT–120
	2	12	7.5	**BLV11**	SOT–123
	6	12	18	**BLY89A**	SOT–56
	6	12	18	**BLY89C**	SOT–120
	6	12	18	**BLW87**	SOT–123
	1.3	26	20	**BLY91A**	SOT–48/2
	1.3	26	20	**BLY91C**	SOT–120
	1.3	26		**BLV20**	SOT–123
	2.5	26	20	**BLY92A**	SOT–48/2
	2.5	26	20	**BLY92C**	SOT–120
	2.5	26		**BLV21**	SOT–123
	8	26	18	**BLX13**	SOT–56
	8	26	20	**BLX13C**	SOT–120
	10	26	20	**BLW83**	SOT–123
	15	26	18	**BLX39**	SOT–120
	17	26	20	**BLW86**	SOT–123
	30	26	18	**BLW78**	SOT–121
	16	45	19.5	**BLW50F**	SOT–123
	50	40	19	**BLW96**	SOT–121

For detailed information on these and other types see Data Handbook S6

Status = C

application	P_L W	V_{CE} V	f MHz	Gp dB	type	case
v.h.f. 28 V–stations; class–B operation	1	28	175	15	**2N3866**	TO–39/1
	4	28	175		**BFS23A**	TO–39/1
	5		175	16	**BLF242**	SOT–123
	8	28	175	12	**BLY91A**	SOT–48/2
	8	28	175	12	**BLY91C**	SOT–120
	8	28	175	12	**BLV20**	SOT–123
	15	28	175	13	**BLF244**	SOT–123
	15	28	175	10	**BLY92A**	SOT–48/2
	15	28	175	10	**BLY92C**	SOT–120
	15	28	175	10	**BLV21**	SOT–123
	25	28	175	9	**BLY93A**	SOT–56
	25	28	175	9	**BLY93C**	SOT–120
	25	28	175	9	**BLW84**	SOT–123
	30		175	16	**BLF245**	SOT–123
	45	28	175	7.5	**BLX39**	SOT–120
	45	28	175	7.5	**BLW86**	SOT–123
	50	28	175	7	**BLY94**	SOT–55
	80	28	175	6.5	**BLV80/28**	SOT–121
	80	28	108	8	**BLW76**	SOT–121
	100	28	150	6	**BLW78**	SOT–121
	130	28	87.5	7.5	**BLW77**	SOT–121
	150	50	108	7.5	**BLX15**	SOT–55
	160	50	108	7	**BLW95**	SOT–121
	200	50	108	6.5	**BLW96**	SOT–121
v.h.f. mobile transmitters; class–B operation	1	12	175	10	**2N4427**	TO–39/1
	2	12.5	175	11	**BFQ42**	TO–39/1
	4	13.5	175	8	**BFS22A**	TO–39/1
	4	12.5	175	12	**BFQ43**	TO–39/3
	8	13.5	175	9	**BLY87A**	SOT–48/2
	8	13.5	175	12	**BLY87C**	SOT–120
	8	13.5	175	9	**BLV10**	SOT–123
	15	13.5	175	10	**BLW29**	SOT–120
	15	13.5	175	7.5	**BLY88A**	SOT–48/2
	15	13.5	175	7.5	**BLY88C**	SOT–120
	15	13.5	175	7.5	**BLV11**	SOT–123
	25	13.5	175	6	**BLY89A**	SOT–56
	25	13.5	175	6	**BLY89C**	SOT–120
	25	13.5	175	6	**BLW87**	SOT–123
	28	13.5	175	9	**BLW31**	SOT–120
	45	12.5	175	6.5	**BLV45/12**	SOT–119
	45	12.5	175	5	**BLW60**	SOT–56
	45	12.5	175	5	**BLW60C**	SOT–120
	45	12.5	175	4.5	**BLW85**	SOT–123
	50	12.5	175	5	**BLY90**	SOT–55
	75	12.5	175	6.5	**BLV75/12**	SOT–119

For detailed information on these and other types see Data Handbook S6

Status = C

application	P_L W	V_B V	f MHz	Gp dB	type	case
v.h.f. modules for mobile transmitters	2	9.6	68–88	17.5	**BGY93A**	SOT–182
	2	9.6	136–156	17.5	**BGY93B**	SOT–182
	2	9.6	148–174	17.5	**BGY93C**	SOT–182
	5	9.6	68–88	21.5	**BGY94A**	SOT–182
	5	9.6	132–156	21.5	**BGY94B**	SOT–182
	5	9.6	148–174	21.5	**BGY94C**	SOT–182
	13	12.5	148–174	19.4	**BGY43**	SOT–132B
	18	12.5	68–88	22.6	**BGY32**	SOT–132B
	18	12.5	80–108	22.6	**BGY33**	SOT–132B
	18	12.5	132–156	20.8	**BGY35**	SOT–132B
	18	12.5	148–174	20.8	**BGY36**	SOT–132B
	18	12.5	175–210	20.8	**BGY45C**	SOT–183
	29	12.5	68–88	23.0	**BGY45A**	SOT–183
	28	12.5	148–174	20.0	**BGY45B**	SOT–183
u.h.f. modules for mobile transmitters	1.4	9.6	400–440	15.0	**BGY46A**	SOT–181
	1.4	9.6	430–470	15.5	**BGY46B**	
	1.4	9.6	370–400	15.5	**BGY46D**	
	2	7.5	400–470	16.0	**BGY47A**	SOT–181
	3.2	9.6	400–470	18.0	**BGY47A**	SOT–181
	2	7.5	460–512	16.0	**BGY47F**	SOT–181
	3.2	9.6	460–512	18.0	**BGY47F**	SOT–181
	5	9.6	400–470	21.5	**BGY48A**	SOT–182
	5	9.6	430–470	21.5	**BGY48B**	SOT–182
	5	9.6	460–512	21.5	**BGY48C**	SOT–182
	2.5	13.5	380–512	17	**BGY22**	SOT–75A
	7	13.5	380–480	4.5	**BGY23**	SOT–75A
	7.5	12.5	400–440	18.8	**BGY40A**	SOT–132C
	7.5	12.5	400–470	18.8	**BGY40B**	SOT–132C
	13	12.5	400–440	19.4	**BGY41A**	SOT–132C
	13	12.5	440–470	19.4	**BGY41B**	SOT–132C
s.h.f modules for portable and mobile transmitters	2.5	7.5	824–849	21	**BGY95A**	SOT–200
	2.5	7.5	890–915	21	**BGY95B**	SOT–200
	2.5	9.6	824–849	21	**BGY96A**	SOT–200
	2.5	9.6	890–915	21	**BGY96B**	SOT–200
	6.0	12.5	806–890	15.7	**BGY90A**	SOT–179
	6.0	12.5	870–950	15.7	**BGY90B**	SOT–179
	1.2	6.0	824–849	30.8	**BGY110A**	SOT–246
	1.2	6.0	872–905	30.8	**BGY110B**	SOT–246
	6.0	12.5	806–890	23.0	**BGY91A**	SOT–233
	6.0	12.5	870–950	23.0	**BGY91B**	SOT–233
	20.0	12.5	400–440	21.2	**BGY49A**	SOT–132
	20.0	12.5	440–470	21.2	**BGY49B**	SOT–132

For detailed information on these and other types see Data Handbook S6

Status = C

application	P_L W	V_{CE} V	V_B V	f MHz	Gp dB	type	case
air communication class–B transmitters (225–400 MHz)	30	28	–	400	10	**BLU50**	SOT–161
	45	28	–	400	9	**BLU51**	SOT–161
	60	28	–	400	8	**BLU52**	SOT–161
	100	28	–	400	6	**BLU53**	SOT–161
u.h.f. base stations class–B operation	1	28	–	470	7	**2N3866**	TO–39/1
	1	28	–	470	11	**BLX91A**	SOT–48/1
	2	28	–	470	12	**BLW89**	SOT–122
	2.5	28	–	470	11	**BLX92A**	SOT–48/1
	4	28	–	470	11	**BLW90**	SOT–122
	7	28	–	470	8.5	**BLX93A**	SOT–48/1
	10	28	–	470	9	**BLW91**	SOT–122
	25	28	–	470	6	**BLX94A**	SOT–48
	25	28	–	470	6.5	**BLX94C**	SOT–122
	40	28	–	470	4.5	**BLX95**	SOT–56
u.h.f. mobile transmitters class–B operation	2	–	12.5	470	6	**BLX65**	TO–39/1
	2	–	12.5	470	9	**BLX65E**	TO–39/3
	2	–	12.5	470	9	**BLW79**	SOT–122
	2.5	–	12.5	470	8.5	**BLX67**	SOT–48/1
	4	–	12.5	470	8	**BLW80**	SOT–122
	5	–	12.5	470	10.5	**BLU99**	SOT–122
	7	–	12.5	470	11	**BLU97**	SOT–122
	7	–	12.5	470	5	**BLX68**	SOT–48/1
	10	–	12.5	470	6	**BLW81**	SOT–122
	20	12.5	12.5	470	7.8	**BLU20/12**	SOT–119
	20	–	13.5	470	4	**BLX69A**	SOT–48/2
	30	–	12.5	470	7.4	**BLU30/12**	SOT–119
	45	–	12.5	470	5.8	**BLU45/12**	SOT–119
	60	–	12.5	470	5.5	**BLU60/12**	SOT–119

For detailed information on these and other types see Data Handbook S6

Status = C

application	P_L W	V_{CE} V	f MHz	Gp dB	type	case
900 MHz base stations class–B operation	2	24	900	8	**BLV99**	SOT–172
	14	24	900	8.5	**BLV98**	SOT–171
	30	24	900	7	**BLV97**	SOT–171
900 MHz mobile transmitters class–B operation	0.5	12.5	900	9.5	**BLU98**	SOT–103
	0.75	7.5	900	8.5	**BLT90/SL**	SOT–172D
	1	12.5	900	7.5	**BLV90;SL**	SOT–172;D
	1.5	7.5	900	6	**BLT91/SL**	SOT–172D
	2	12.5	900	6.5	**BLV91;SL**	SOT–172;D
	3	7.5	900		**BLT92/SL**	SOT–122D
	4	12.5	900	5.5	**BLU99**	SOT–122
	4	12.5	900	7.5	**BLV92**	SOT–171
	8	12.5	900	6.5	**BLV93**	SOT–171
	12.5	12.5	900	6	**BLV94**	SOT–171
	25	12.5	900	5.5	**BLV95**	SOT–171
f.m. broadcast transmitters class–B operation	1	28	87.5–108	18	**2N3866**	TO–39/3
	4	28	87.5–108	20	**BLW90**	SOT–122
	15	28	87.5–108	15	**BLV21**	SOT–123
	45	28	87.5–108	11	**BLX39**	SOT–120
	45	28	87.5–108	11	**BLW86**	SOT–123
	100	28	87.5–108	8	**BLW78**	SOT–121
	175	28	87.5–108	10.5	**BLV25**	SOT–119

For detailed information on these and other types see Data Handbook S6

TV transposer types for application in band III, IV and V.
Status = C

application	$P_o$sync W	V_{CE} V	f MHz	Gp dB	d_{im} dB	type	case
TV transposer circuits; band III; class–A operation	1.5	25	225	20	−60	**BLV30**	SOT–122
	5	25	225	16.5	−58	**BLV31**	SOT–122
	10	25	225	16	−55	**BLV32F**	SOT–160
	16	25	225	13.5	−55	**BLV33F**	SOT–119
	19	25	225	9	−55	**BLV33**	SOT–147
TV transmitter circuits; band III; class–AB operation	85*	28	225	10.5	–	**BLV33F**	SOT–119
	90*	28	225	6.5	–	**BLV33**	SOT–147
	120*	28	225	10	–	**BLV36**	SOT–161
	225	35	225		−8.5	**BLV38**	SOT–179
TV transposer circuits; band IV–V; class–A operation			860			**BFR96S****	SOT–37
						BFQ34**	SOT–122
	0.5	25	860	11	−60	**BLW32**	SOT–122
	0.7		860		−60	**BFQ68****	SOT–122
	1.0	25	860	10	−60	**BLW33**	SOT–122
	1.8	25	860	9	−60	**BLW34**	SOT–122
	3.5	25	860	6.5	−60	**BLW98**	SOT–122
	6	25	860	8	−60	**BLV57**	SOT–161
TV transmitter circuits; band IV–V; class–AB operation	30*	25	860	7.0	–	**BLV59**	SOT–171
F.M. transmitter B.C. class B	250	28	108		−11	**BLV37**	SOT–179

* at 1 dB power gain compression.
** see also pages S124, S125 and Data Handbook 'Wideband transistors and hybrids (S10)'

For detailed information on these and other types see Data Handbook S6

Status = C

type	case	mode of operation	V_{CE} V	frequency MHz	output power W	power gain dB
BFQ34	SOT–122					
BFQ42	TO–39/1	c.w.; class–B	13.5	175	2	> 11
			12.5	175	2	typ 10.5
BFQ43;S	TO–39/3	c.w.; class–B	13.5	175	4	> 12
			12.5	175	4	typ 12
BFQ68	SOT–122					
BFR96S	SOT–37					
BFS22A	TO–39/1	c.w.; class–B	13.5	175	4	> 8
			12.5	175	4	typ 8
BFS23A	TO–39/1	c.w.; class–B	28	175	4	> 10
BGY...	see Modules page S120					
BLF146	SOT–121	s.s.b.; class–AB	28	28	80	
BLF242	SOT–123	c.w.; class–B	28	175	5	> 16
BLF244	SOT–123	c.w.; class–B	28	175	15	> 16
BLF245	SOT–123	c.w.; class–B	28	175	30	> 16
BLT90/SL	SOT–172D	c.w.; class–B	7.5	900	0.75	> 8.5
BLT91/SL	SOT–172D	c.w.; class–B	7.5	900	1.5	> 6
BLT92/SL	SOT–122D	c.w.; class–B	7.5	900	3	
BLU20/12	SOT–119	c.w.; class–B	12.5	470	20	> 7.8
BLU30/12	SOT–119	c.w.; class–B	12.5	470	30	> 7.4
BLU45/12	SOT–119	c.w.; class–B	12.5	470	45	> 5.8
BLU50	SOT–161	c.w.; class–B	28	400	30	
BLU51	SOT–161	c.w.; class–B	28	400	45	
BLU52	SOT–161	c.w.; class–B	28	400	60	
BLU53	SOT–161	c.w.; class–C	28	400	100	
BLU60/12	SOT–119	c.w.; class–B	12.5	470	60	> 5.5
BLU97	SOT–122	c.w.; class–B	12.5	470	7	> 8.5
BLU98	SOT–103	c.w.; class–B	12.5	900	0.5–	> 8.0
BLU99	SOT–122	c.w.; class–B	12.5	470	5	> 10.5
			12.5	900	4	typ 7,0
BLV10	SOT–123	c.w.; class–B	13.5	175	8	> 9
			12.5	175	8	typ 10.5
		s.s.b.; class–A	12	28	1 (note 3)	18
BLV11	SOT–123	c.w.;class–B	13.5	175	15	> 8.0
			12.5	175	15	typ 7.5
		s.s.b.; class–A	12	28	2 (note 3)	18
		s.s.b.; class–AB	13.5	28	10 (note 4)	18
BLV20	SOT–123	c.w.; class–B	28	175	8	> 12
		s.s.b.; class–A	26	28	1.3–(note 3)	20
BLV21	SOT–123	c.w.; class–B	28	175	15	> 10
		s.s.b.; class–A	26	28	2.3–(note 3)	20
BLV25	SOT–119	c.w.; class–B narrow band	28	108	175	> 10

Notes
1. $P_{o\ sync}$ at $d_{im} < -60$ dB
2. $P_{o\ sync}$ at $d_{im} < -55$ dB
3. P.E.P. at $d_3 < -40$ dB
4. P.E.P. at d_3 typ. -30 dB
5. P.E.P.

Alphanumeric list

For detailed information on these and other types see Data Handbook S6

Status = C

type	case	mode of operation	V_{CE} V	frequency MHz	output power W	power gain dB
BLV30	SOT–122	lin. ampl., class–A	25	225	1.5 (note 1)	> 18
			25	225	1.7 (note 1)	typ 20
BLV31	SOT–122	lin. ampl., class–A	25	225	5 (note 1)	> 15
			25	225	7 (note 1)	typ 16.5
BLV32F	SOT–160	lin. ampl., class–A	25	225	10 (note 2)	> 16
			25	225	12.5 (note 2)	typ 17.2
BLV33	SOT–147	lin. ampl., class–A	25	225	19 (note 2)	> 9
			25	225	26 (note 2)	typ 9.7
		lin. ampl., class–AB	28	225	90 (note 2)	typ 6.5
BLV33F	SOT–119	lin. ampl., class–A	25	225	16 (note 2)	> 13.5
			25	225	22 (note 2)	typ 14.8
		lin. ampl., class–AB	28	225	85 (note 2)	typ 10.5
BLV36	SOT–161	lin. ampl., class–AB	28	225	115	> 10
			28	225	115	typ 13.0
BLV37	SOT–179	F.M. b.c. transmitter class–B	28	108	250	> 11
BLV38	SOT–179	TV transmitter band III class–AB	35	225	225	> 8.5
BLV45/12	SOT–119	c.w.; class–B	12.5	175	45	> 6.5
BLV57	SOT–161	lin. ampl., class–A	25	860	6 (note 1)	> 8.0
			25	860	12 typ (note 2)	typ 9
		c.w.; class–AB	25	860	38	typ 6.5
BLV59	SOT–161	lin. ampl., class–AB	25	860	30 (note 5)	7
BLV75/12	SOT–119	c.w.; class–B	12.5	175	75	> 6.5
BLV80/28	SOT–121	c.w.; class–B	28	175	80	> 6.5
BLV90	SOT–172	c.w.; class–B	12.5	900	1	> 7.5
BLV90/SL	SOT–172D	c.w.; class–B	12.5	900	1	> 7.5
BLV91	SOT–172	c.w.; class–B	12.5	900	2	> 6.5
BLV91/SL	SOT–172D	c.w.; class–B	12.5	900	2	> 6.5
BLV92	SOT–171	c.w.; class–B	12.5	900	4	> 7.5
BLV93	SOT–171	c.w.; class–B	12.5	900	8	> 6.5
BLV94	SOT–171	c.w.; class–B	12.5	900	12.5	> 6.0
BLV95	SOT–171	c.w.; class–B	12.5	900	22.5	> 5.5
BLV97	SOT–171	c.w.; class–B	24	900	30	> 7.0
BLV98	SOT–171	c.w.; class–B	24	900	14	> 8.5
BLV99	SOT–172	c.w.; class–B	24	900	2	> 8

Notes

1. $P_{o\ sync}$ at $d_{im} < -60$ dB
2. $P_{o\ sync}$ at $d_{im} < -55$ dB
3. P.E.P. at $d_3 < -40$ dB
4. P.E.P. at d_3 typ. -30 dB
5. at 1 dB compression

R.F. POWER TRANSISTORS AND MODULES (cont.)

Alphanumeric list

For detailed information on these and other types see Data Handbook S6

Status = C type	case	mode of operation	V_{CE} V	frequency MHz	output power W	power gain dB
BLW29	SOT–120	c.w.; class–B	13.5	175	15	> 10
			12.5			typ 10.5
BLW31	SOT–120	c.w.; class–B	13.5	175	28	> 9
			12.5	175	28	typ 9.5
BLW32	SOT–122	lin. ampl., class–A	25	860	0.5 (note 1)	> 11
			25	860	0.63 (note 1)	typ 12.2
BLW33	SOT–122	lin. ampl., class–A	25	860	1.0 (note 1)	> 10
			25	860	1.15 (note 1)	typ 10.5
BLW34	SOT–122	lin. ampl., class–A	25	860	1.8 (note 1)	> 9
			25	860	2.15 (note 1)	typ 10.2
BLW50F	SOT–123	s.s.b.; class–A	45	1.6–28	0–16 (note 3)	> 19.5
		s.s.b.; class–AB	50	1.6–28	10–65 (note 4)	typ 18
BLW60	SOT–56	c.w.; class–B	12.5	175	45	> 5.0
		s.s.b.; class–AB	12.5	1.6–28	3–30 (note 4)	typ 19.5
BLW60C	SOT–120	c.w.; class–B	12.5	175	45	> 5
		s.s.b.; class–AB	12.5	1.6–28	3–30 (note 4)	typ 19.5
BLW76	SOT–121	s.s.b.; class–AB	28	1.6–28	8–80 (note 4)	> 13
		c.w.;class–B	28	108	80	typ 7.9
BLW77	SOT–121	s.s.b.; class–AB	28	1.6–28	15–130 (note 4)	> 12
		c.w.; class–B	28	87.5	130	typ 7.5
BLW78	SOT–121	c.w.; class–B	28	150	100	> 6
		s.s.b.; class–A	26	28	35 (note 3)	typ 19.5
		s.s.b.; class–AB	28	28	100 (note 4)	typ 19.0
BLW79	SOT–122	c.w.; class–B	12.5	470	2	> 9.0
			12.5	175	2	typ 13.5
BLW80	SOT–122	c.w.; class–B	12.5	470	4	> 8.0
			12.5	175	4	typ 15
BLW81	SOT–122	c.w.; class–B	12.5	470	10	> 6.0
			12.5	175	10	typ 13.5
BLW82	SOT–119	c.w.; class–B	12.5	470	30	> 5
			13.5	470	30	typ 5
BLW83	SOT–123	s.s.b.; class–A	26	1.6–28	0–10 (note 3)	> 20
		s.s.b.; class–AB	28	1.6–28	3–30 (note 4)	typ 21
BLW84	SOT–123	c.w.; class–B	28	175	25	> 9
BLW85	SOT–123	c.w.; class–AB	12.5	175	45	> 4.5
		s.s.b.; class–AB	12.5	1.6–28	3–30 (note 4)	typ 19.5
BLW86	SOT–123	c.w.; class–B	28	175	45	> 7.5
		s.s.b.; class–AB	28	1.6–28	5–47 (note 4)	typ 19
		s.s.b.; class–A	26	1.6–28	17 (note 3)	typ 22
		class–B	28	87.5–108	45	> 11

Notes

1. $P_{o\ sync}$ at $d_{im} < -60$ dB.
2. $P_{o\ sync}$ at $d_{im} < -55$ dB.
3. P.E.P. at $d_3 < -40$ dB.
4. P.E.P. at d_3 typ. -30 dB.

For detailed information on these and other types see Data Handbook S6

Status = C

type	case	mode of operation	V_{CE} V	frequency MHz	output power W	power gain dB
BLW87	SOT–123	c.w.; class–B	13.5	175	25	> 6
BLW89	SOT–122	c.w.; class–B	28	470	2	> 12
BLW90	SOT–122	c.w.; class–B	28	470	4	> 11
BLW91	SOT–122	c.w.; class–B	28	470	10	> 9
BLW95	SOT–121	s.s.b.; class–AB	50	1.6–28	20–160 (note 4)	> 14
BLW96	SOT–121	s.s.b.; class–AB	50	1.6–28	25–200 (note 4)	> 13.5
		c.w.; class–B	50	108	200	typ 6.5
		s.s.b.; class–A	40	28	50 (note 3)	typ 19
BLW97	SOT–121	s.s.b.; class–AB	28	1.6–28	175 (note 4)	> 11.5
BLW98	SOT–122	lin. ampl., class–A	25	860	3.5 (note 1)	> 6.5
			25	860	4.4 (note 1)	typ 7.0
BLW99	SOT–121	s.s.b.; class–AB	12.5	1.6–28	80 (note 4)	> 12.5
BLX13	SOT–56	s.s.b; class–A	26	28	0–8 (note 3)	> 18
		s.s.b.; class–AB	28	28	25 (note 4)	> 18
		c.w.; class–B	28	70	25	typ 17
BLX13C	SOT–120	s.s.b.; class–A	26	1.6–28	0.8 (note 3)	> 20
		s.s.b.; class–AB	28	1.6–28	3–25 (note 4)	typ 21
BLX14	SOT–55	s.s.b.; class–A	28	1.6–28	25 (note 3)	> 13
		s.s.b.; class–AB	28	1.6–28	7.5–50 (note 4)	> 13
		c.w.; class–B	28	70	50	> 7.5
		c.w.; class–B	28	30	50	typ 16
BLX15	SOT–55	s.s.b.; class–AB	50	1.6–28	20–150 (note 4)	> 14
		s.s.b.; class–A	40	1.6–28	30 (note 3)	> 14
		c.w.; class–B	50	70	150	> 10
		c.w.; class–B	50	108	150	typ 7.4
BLX39	SOT–120	c.w.; class–B	28	175	45	> 7.5
		s.s.b.; class–AB	28	1.6–28	5–42.5 (note 4)	typ 19
		s.s.b.; class–A	26	1.6–28	15 (note 3)	typ 20
BLX65	TO–39/1	c.w.; class–B	13.8	470	2	typ 7
			12.5	470	2	> 6
			12.5	175	2	typ 12
BLX65E	TO–39/3	c.w.; class–B	12.5	175	2	typ 16
			12.5	470	2	> 9
BLX67	SOT–48/1	c.w.; class–B	13.8	470	1.5	typ 10
			13.8	470	3.0	typ 9.3
			12.5	470	2.5	> 8.5
			12.5	175	3.0	typ 20

Notes

1. $P_{o\ sync}$ at $d_{im} < -60$ dB
2. $P_{o\ sync}$ at $d_{im} < -55$ dB
3. P.E.P. at $d_3 < -40$ dB
4. P.E.P. at d_3 typ. -30 dB

For detailed information on these and other types see Data Handbook S6

Status = C

type	case	mode of operation	V_{CE} V	frequency MHz	output power W	power gain dB
BLX68	SOT–48/1	c.w.; class–B	13.8	470	7	> 5.4
			13.8	470	7.8	typ 5.9
			12.5	470	7.0	> 5.0
			12.5	175	7.2	typ 12.6
BLX69A	SOT–48/2	c.w.; class–B	13.5	470	20	> 4
			12.5	470	17	> 4
			12.5	175	17	typ 11
BLX91A	SOT–48/1	c.w.; class–B	24	470	0.85	typ 12.3
			28	470	1.0	> 11
			28	470	1.45	typ 12.6
			28	1000	1.4	typ 5.4
BLX91CB	SOT–48/3	video cathode driver	28	'V_{CESM} max. 65 V; C_c typ. 3 pF'		
BLX92A	SOT–48/1	c.w.; class–B	24	470	2.4	typ 10.8
			28	470	2.5	> 11
			28	470	3.0	typ 11.7
			28	1000	2.5	typ 5.5
BLX93A	SOT–48/1	c.w.; class–B	24	470	7.0	typ 8.5
			28	470	7.0	> 8.5
			28	470	8.0	typ 9.0
			28	1000	5.0	typ 5.2
BLX94A	SOT–48/2	c.w.; class–B	28	470	25	> 6
BLX94C	SOT–122	c.w.; class–B	28	470	25	> 6.5
BLX95	SOT–56	c.w.; class–B	28	470	40	< 4.5
			28	175	40	typ 11
BLX96	SOT–48/3	class–A	25	860	0.5 (note 1)	> 6
			25	860	0.6 (note 1)	typ 7
BLX97	SOT–48/3	class–A	25	860	1.0 (note 1)	> 5.5
			25	860	1.1 (note 1)	typ 6.5
BLX98	SOT–48/2	class–A	25	860	3.5 (note 1)	> 5.0
			25	860	4.0 (note 1)	typ 5.5

Notes
1. $P_{o\ sync}$ at $d_{im} < -60$ dB
2. $P_{o\ sync}$ at $d_{im} < -55$ dB
3. P.E.P. at $d_3 < -40$ dB
4. P.E.P. at d_3 typ. -30 dB

R.F. POWER TRANSISTORS AND MODULES (cont.)

Alphanumeric list

For detailed information on these and other types see Data Handbook S6

Status = C

type	case	mode of operation	V_{CE} V	frequency MHz	output power W	power gain dB
BLY87A	SOT–48/2	c.w.; class–B	13.5 12.5	175 175	8 8	> 9 typ 9
BLY87C	SOT–120	c.w.; class–B	13.5 12.5	175 175	8 8	> 12 typ 11.5
BLY88A	SOT–48/2	c.w.; class–B	13.5 12.5	175 175	15 15	> 7.5 typ 7.5
BLY88C	SOT–120	c.w.; class–B	13.5 12.5	175 175	15 15	> 8.0 typ 7.5
BLY89A	SOT–56	c.w.; class–B	13.5	175	25	> 6
BLY89C	SOT–120	c.w.; class–B	13.5	175	25	> 6
BLY90	SOT–55	c.w.; class–B	12.5	175	50	> 5.0
BLY91A	SOT–48/2	c.w.; class–B	28	175	8	> 12
BLY91C	SOT–120	c.w.; class–B	28	175	8	> 12
BLY92A	SOT–48/2	c.w.; class–B	28	175	15	> 10
BLY92C	SOT–120	c.w.; class–B	28	175	15	> 10
BLY93A	SOT–56	c.w.; class–B	28	175	25	> 9
BLY93C	SOT–120	c.w.; class–B	28	175	25	> 9
BLY94	SOT–55	c.w.; class–B	28	175	50	> 7
2N3375	TO–60	c.w.; class–B	28 28	100 400	7.5 >3	> 8.8 > 4.8
2N3553	TO–39(1)	c.w.; class–B class–B	28 28	175 87.5–108	2.5 1	> 10 > 18
2N3632	TO–60	c.w.; class–B	28	175	>13.5	> 5.9
2N3866	TO–39/1	c.w.; class–B	28	400	1	> 10
2N3924	TO–39/1	c.w.; class–B	13.5	175	4	> 6
2N3926	TO–60	c.w.; class–B	13.5	175	7	> 5.4
2N3927	TO–60	c.w.; class–B	13.5	175	12	> 4.8
2N4427	TO–39/1	c.w.; class–B	12	175	1	> 10

For detailed information on these and other types see Data Handbook S6

Status = C

module type	case	mode of operation	$V_{S1.S2}$ V	frequency MHz	output power W	power gain dB
BGY22	SOT–75A	c.w.	13.5	380–512	> 2.5	17
BGY23	SOT–75A	c.w.	13.5	380–480	> 7.0	4.5
BGY32	SOT–132	c.w.	12.5	68–88	> 18	22.6
BGY33	SOT–132	c.w.	12.5	80–108	> 18	22.6
BGY35	SOT–132	c.w.	12.5	132–156	> 18	20.6
BGY36	SOT–132	c.w.	12.5	148–174	> 18	20.8
BGY40A	SOT–132	c.w.	12.5	400–440	> 7.5	18.8
BGY40B	SOT–132	c.w.	12.5	440–470	> 7.5	18.8
BGY41A	SOT–132	c.w.	12.5	400–440	> 13	19.4
BGY41B	SOT–132	c.w.	12.5	440–470	> 13	19.4
BGY43	SOT–132	c.w.	12.5	148–174	> 13	19.4
BGY45A	SOT–183	c.w.	12.5	68–88	> 29	20.0
BGY45B	SOT–183	c.w.	12.5	148–174	> 28	19.7
BGY45C	SOT–183	c.w.	12.5	170–210	> 18	23.5
BGY46A	SOT–181	c.w.	9.6	400–440	> 1.4	15.0
BGY46B	SOT–181	c.w.	9.6	430–470	> 1.4	15.0
BGY46D	SOT–181	c.w.	9.6	370–430	> 1.4	15.0
BGY47A	SOT–181	c.w.	7.5	400–470	> 2.0	18.0
BGY47A	SOT–181	c.w.	9.6	400–470	> 3.2	18.0
BGY47F	SOT–181	c.w.	7.6	460–512	> 2.0	16.0
BGY47F	SOT–181	c.w.	9.6	460–512	> 3.2	18.0
BGY48A	SOT–182	c.w.	9.6	400–440	> 5	21.0
BGY48B	SOT–182	c.w.	9.6	430–470	> 5	21.0
BGY48C	SOT–182	c.w.	9.6	460–512	> 5	21.0
BGY49A	SOT–132	c.w.	12.5	400–440	> 20.0	21.2
BGY49B	SOT–132	c.w.	12.5	440–470	> 20.0	21.2
BGY90A	SOT–179	c.w.	12.5	806–890	> 6.0	17.5
BGY90B	SOT–179	c.w.	12.5	870–950	> 6.0	17.5
BGY91A	SOT–233	c.w.	12.5	806–890	> 6.0	23.0
BGY91B	SOT–233	c.w.	12.5	870–850	> 6.0	23.0
BGY93A	SOT–182	c.w.	9.6	68–88	> 2.0	17.5
BGY93B	SOT–182	c.w.	9.6	136–156	> 2.0	17.5
BGY93C	SOT–182	c.w.	9.6	148–174	> 2.0	17.5
BGY94A	SOT–182	c.w.	9.6	68–88	> 5.0	17.5
BGY94B	SOT–182	c.w.	9.6	132–156	> 5.0	17.5
BGY94C	SOT–182	c.w.	9.6	148–174	> 5.0	17.5
BGY95A	SOT–200	c.w.	7.5	825–845	> 2.2	20.4
BGY95B	SOT–200	c.w.	7.5	890–915	> 2.2	20.4
BGY96A	SOT–200	c.w.	9.6	825–845	> 2.5	21.0
BGY96B	SOT–200	c.w.	9.6	890–915	> 2.5	21.0
BGY101A	SOT–246	c.w.	6.0	824–849	> 1.2	30.8
BGY101B	SOT–246	c.w.	6.0	872–905	> 1.2	30.8

For detailed information on these and other types see Data Handbook S10

The table gives the preferred npn transistors and their complements for wideband applications. The sequence is the linear output voltage capability. The values for V_o, ITO and PL1 are typical.

f_T = 5 GHz

	I_C (mA) V_{CE} (V)		14 10	30 8	70 10	80 10	90 10	120 15	240 15	600 18
	V_o (mV)		150	425	700	700	750	1200	1600	2500
	ITO (dBm)		27	36	40	–	43	45	47	52
envelope	PL1 (dBm)		8	17	21	–	24	26	28	33
SOT–37	*	BFT24	BFR90A	BFR91A	BFR96S		BFQ34T			
	**		BFQ51	BFQ23	BFQ32S		BFQ54T			
SOT–23	*	BFT25	BFR92A	BFR93A	BFR106					
	**		BFT92	BFT93						
SOT–89	*				BFQ19	BFQ18A				
	**				BFQ149					
SOT–122	*							BFQ34	BFQ68	BFQ136
	**							BFQ54		
SOT–103	*		BFG90A	BFG91A	BFG96		BFG34			
	**		BFG51	BFG23	BFG32		BFG54			
SOT–143	*		BFG92A	BFG93A						
SOT–173	*		BFP90A	BFP91A	BFP96					
	**		BFQ51C	BFQ23C	BFQ32C					
SOT–223	*				BFG97		BFG35			
TO–72	*		BFQ53	BFQ22S	BFQ63					
	**		BFQ52	BFQ24	BFQ32M					

f_T = 7.5 GHz

envelope	I_C (mA) V_{CE} (V)		15 8	50 8	100 10	120 18
SOT–37	*		BFQ65		BFR134	
SOT–23	*		BFQ67			
SOT–103	*		BFG65	BFG195	BFG134	
SOT–143	*		BFG67	BFG197		
SOT–172	*					BFQ135
SOT–173	*		BFQ66			
SOT–223	*			BFG198	BFG135	

* polarity = NPN
** polarity = PNP

For detailed information on these and other types see Data Handbook S10

type number	n–p–n or p–n–p	envelope	ratings V_{CEO} V	I_C mA	P_{tot} mW	characteristics f_T GHz	F at dB	f MHz
BF689K	n	TO–92	15	25	360	1.8	3.0	200
BF763	n	TO–92	15	25	500	1.8	5.0	800
BFG17A	n	SOT–143	15	25	300	2.8	2.5	800
BFG23	p	SOT–103	12	35	180	5.0	3.7	800
BFG32	p	SOT–103	15	75	700	4.5	4.3	800
BFG33	n	SOT–143	7	20	140	12	3	2000
BFG34	n	SOT–103	18	150	1000	3.7	2.3	800
BFG35	n	SOT–223	18	150	1000	4.0	2.3	800
BFG51	p	SOT–103	15	25	180	5.0	3.4	800
BFG54	p	SOT–103	18	150	1000	4.5	–	–
BFG65	n	SOT–103	10	50	300	7.5	3.0	2000
BFG67	n	SOT–143	10	50	300	7.5	3.0	2000
BFG90A	n	SOT–103	15	25	180	5.0	2.4	800
BFG91A	n	SOT–103	12	35	300	6.0	2.3	800
BFG92A	n	SOT–143	15	25	300	5.0	1.8	800
BFG93A	n	SOT–143	12	35	300	6.0	1.6	800
BFG96	n	SOT–103	15	150	700	5.0	3.7	800
BFG97	n	SOT–223	15	150	700	5.0	3.7	800
BFG134	n	SOT–103	18	150	1000	7.5	–	–
BFG135	n	SOT–103	10	150	1000	7.5	–	–
BFG195	n	SOT–103	10	100	500	7.5	1.9	800
BFG197	n	SOT–143	10	100	300	7.5	1.9	800
BFG198	n	SOT–223	10	100	300	7.5	4.0	2000
BFP90A	n	SOT–173	15	30	250	5.0	2.4	800
BFP91A	n	SOT–173	12	50	350	6.0	2.3	800
BFP96	n	SOT–173	15	100	500	5.0	2.5	800
BFQ17	n	SOT–89	25	150	1000	1.2	–	–
BFQ18A	n	SOT–89	15	150	1000	3.6	–	–
BFQ19	n	SOT–89	15	75	500	5.0	–	–
BFQ22S	n	TO–72	12	35	150	5.0	1.9	500
BFQ23	p	SOT–37	12	35	180	5.0	2.4	500
BFQ23C	p	SOT–173	12	50	350	5.0	3.7	800
BFQ24	p	TO–72	12	35	150	5.0	2.4	500
BFQ32	p	SOT–37	15	75	500	4.2	3.8	500
BFQ32C	p	SOT–173	15	100	500	4.5	4.2	800
BFQ32M	p	TO–72	15	75	250	4.5	2.3	500
BFQ32S	p	SOT–37	15	100	700	4.5	4.3	800
BFQ33C	n	SOT–173	7	20	140	12.0	3.0	2000
BFQ34	n	SOT–122	18	150	2250	3.9	8.0	500
BFQ34T	n	SOT–37	18	150	1000	3.7	–	–
BFQ51	p	SOT–37	15	25	180	5.0	2.4	800
BFQ51C	p	SOT–173	15	30	250	5.0	2.5	800
BFQ52	p	TO–72	15	25	150	5.0	2.7	500
BFQ53	n	TO–72	15	25	150	5.0	2.4	500
BFQ54	n	SOT–122	18	150	2250	4.5	–	–
BFQ54T	n	SOT–37	18	150	1000	4.5	–	–
BFQ63	n	TO–72	15	75	250	4.5	2.3	500
BFQ65	n	SOT–37	10	50	300	7.5	3.0	2000
BFQ66	n	SOT–173	10	50	350	7.5	3.0	2000
BFQ67	n	SOT–23	10	50	180	7.5	3.0	2000

all values are typical unless otherwise stated

* typical reference at d_{im} = −6 dB

** typical reference values

Wideband transistors (cont.)

For detailed information on these and other types see Data Handbook S10

G_{UM} at dB	f MHz	V_O* mV	PL1** dBm	ITO** dBm	I_C mA	V_{CE} V	type
16	200	–	–	–	–	–	**BF689K**
–	–	–	–	–	–	–	**BF763**
15.5	800	150	7	26	14	10	**BFG17A**
14.5	800	400	16	35	30	8	**BFG23**
13.5	800	500	18	37	70	10	**BFG32**
13	2000	–	–	–	–	–	**BFG33**
14.5	800	750	22	41	90	10	**BFG34**
–	–	–	–	–	–	–	**BFG35**
16.5	800	150	7	26	14	10	**BFG51**
–	–	–	–	–	–	–	**BFG54**
10.5	2000	–	–	–	–	–	**BFG65**
10	2000	–	–	–	–	–	**BFG67**
19	800	150	8	27	14	10	**BFG90A**
17.5	800	425	17	36	30	8	**BFG91A**
9.5	2000	–	–	–	–	–	**BFG92A**
9	2000	–	–	–	–	–	**BFG93A**
15	800	700	21	40	70	10	**BFG96**
–	–	–	–	–	–	–	**BFG97**
8	2000	–	–	–	100	10	**BFG134**
8	2000	–	–	–	100	10	**BFG135**
11	2000	–	–	–	–	–	**BFG195**
11	2000	–	–	–	–	–	**BFG197**
9	2000	–	–	–	50	8	**BFG198**
19.5	800	150	8	27	14	10	**BFP90A**
18.5	800	425	17	36	30	8	**BFP91A**
15	800	700	21	40	70	10	**BFP96**
6.5	800	–	–	–	–	–	**BFQ17**
–	–	700	21	40	80	10	**BFQ18A**
7.5	800	500	18	37	50	10	**BFQ19**
16	500	300	14	33	30	5	**BFQ22S**
16.5	500	300	14	33	30	5	**BFQ23**
15	800	400	16	35	30	8	**BFQ23C**
15	500	300	14	33	30	5	**BFQ24**
14	500	500	18	37	50	10	**BFQ32**
13	800	500	19	38	70	10	**BFQ32C**
11	500	–	–	–	–	–	**BFQ32M**
10	800	600	20	39	70	10	**BFQ32S**
13.3	2000	–	–	–	–	–	**BFQ33C**
16.3	500	1200	26	45	120	15	**BFQ34**
19.5	300	1000	24	43	100	10	**BFQ34T**
18	500	150	7	26	14	10	**BFQ51**
16.5	800	150	8	27	14	10	**BFQ51C**
17	500	150	7	26	14	10	**BFQ52**
18	500	150	7	26	14	10	**BFQ53**
16	500	900	–	–	–	–	**BFQ54**
18	300	200	–	–	–	–	**BFQ54T**
11.5	500	500	18	37	50	10	**BFQ63**
8	2000	–	–	–	–	–	**BFQ65**
11.5	2000	–	–	–	–	–	**BFQ66**
8	2000	–	–	–	–	–	**BFQ67**

all values are typical unless otherwise stated

* typical reference at d_{im} = –6 dB

** typical reference values

Wideband transistors (cont.)

For detailed information on these and other types see Data Handbook S10

type number	n–p–n or p–n–p	envelope	ratings			characteristics		
			V_{CEO} V	I_C mA	P_{tot} mW	f_T GHz	F at dB	f MHz
BFQ68	n	SOT–122	18	300	4500	4,0	–	–
BFQ135	n	SOT–172	18	150	2250	7,5	–	–
BFQ136	n	SOT–122	18	600	9000	4,0	–	–
BFQ149	p	SOT–89	15	75	1000	4.5	3.8	500
BFR53	n	SOT–23	10	50	250	2,0	5,0	500
BFR64	n	SOT–48	25	200	3500	1,0	6,0	200
BFR65	n	SOT–48	25	400	5000	> 1.0	–	–
BFR90	n	SOT–37	15	25	180	5.0	2.4	500
BFR90A	n	SOT–37	15	25	180	5.0	2.4	800
BFR91	n	SOT–37	12	35	180	5.0	1.9	500
BFR91A	n	SOT–37	12	35	300	6.0	2.3	800
BFR92	n	SOT–23	15	25	200	5.0	2.4	500
BFR92A	n	SOT–23	15	25	200	5.0	2.4	800
BFR93	n	SOT–23	12	35	200	5.0	1.9	500
BFR93A	n	SOT–23	12	35	250	5.0	2.3	800
BFR94	n	SOT–48	25	150	3500	3.5	5.0	500
BFR95	n	TO–39	25	150	1500	3.5	9.0	200
BFR96	n	SOT–37	15	75	500	5.0	3.3	500
BFR96S	n	SOT–37	15	100	700	5.0	4.0	800
BFR106	n	SOT–23	15	100	350	4.0	3.6	800
BFR134	n	SOT–37	18	150	1000	7.5	–	–
BFS17	n	SOT–23	15	25	250	1.3	4.5	500
BFS17A	n	SOT–23	15	25	300	2.8	2.5	800
BFT24	n	SOT–37	5	2.5	30	2.3	3.8	500
BFT25	n	SOT–23	5	6.5	50	2.3	3.8	500
BFT92	p	SOT–23	15	25	200	5.0	2.7	500
BFT93	p	SOT–23	12	35	200	5.0	2.4	500
BFW16A	n	TO–39	25	150	1500	1.2	< 6.0	200
BFW17A	n	TO–39	25	150	1500	1.1	–	–
BFW30	n	TO–72	10	50	250	1.6	< 5.0	500
BFW92	n	SOT–37	15	25	190	1.6	4.0	500
BFW92A	n	SOT–37	15	25	200	2.8	2.5	800
BFW93	n	SOT–37	10	50	190	1.7	< 5.0	500
BFX89	n	TO–72	15	25	200	1.2	3.3	200
BFY90	n	TO–72	15	25	200	1.4	2.5	200
2N918	n	TO–72	15	50	200	< 0.9	< 6.0	60

all values are typical unless otherwise stated

* typical reference at d_{im} = –6 dB

** typical reference values

Wideband transistors (cont.)

For detailed information on these and other types see Data Handbook S10

G_{UM} at dB	f MHz	V_O* mV	PL1** dBm	ITO** dBm	I_C mA	V_{CE} V	type
13	800	1600	28	47	240	15	**BFQ68**
8	2000	–	–	–	–	–	**BFQ135**
12.5	800	2500	33	52	500	15	**BFQ136**
12	500	–	–	–	50	10	**BFQ149**
10.5	800	100	5	24	30	5	**BFR53**
–	–	–	–	–	–	–	**BFR64**
–	–	–	–	–	–	–	**BFR65**
19.5	500	150	7	26	14	10	**BFR90**
15	800	150	8	27	14	10	**BFR90A**
18	500	300	14	33	30	5	**BFR91**
14	800	425	17	36	30	8	**BFR91A**
18	500	150	7	26	14	10	**BFR92**
15	800	150	8	27	14	10	**BFR92A**
16.5	500	300	14	33	30	5	**BFR93**
14	800	425	16	35	30	8	**BFR93A**
13.5	500	700	21	40	90	20	**BFR94**
–	–	1000	24	43	80	18	**BFR95**
15.2	500	500	18	37	50	10	**BFR96**
11.5	800	700	21	40	70	10	**BFR96S**
11.5	800	250	–	–	30	6	**BFR106**
8	2000	–	–	–	–	–	**BFR134**
–	–	–	–	–	–	–	**BFS17**
13.5	800	150	7	26	14	10	**BFS17A**
17	500	–	–	–	–	–	**BFT24**
18	500	–	–	–	–	–	**BFT25**
18	500	150	7	26	14	10	**BFT92**
16.5	500	300	14	33	30	5	**BFT93**
–	–	–	–	–	–	–	**BFW16A**
–	–	–	–	–	–	–	**BFW17A**
–	–	100	5	24	30	6	**BFW30**
–	–	–	–	–	–	–	**BFW92**
13	800	150	7	26	14	10	**BFW92A**
10.5	800	100	5	24	30	5	**BFW93**
–	–	–	–	–	–	–	**BFX89**
–	–	–	–	–	–	–	**BFX90**
36	200	–	–	–	–	–	**2N918**

all values are typical unless otherwise stated

* typical reference at d_{im} = –6 dB

** typical reference values

Wideband modules for CATV

For detailed information on these and other types see Data Handbook S10

type	power gain dB at 50 MHz	slope (cable equivalent) dB*	max flatness dB*	min return loss (input/output) dB*	min output-voltage dBmV
40 to 300 (330) MHz frequency range					
					dBmV[5)]
BGY50	12.5 ±0.4	0.2–0.8	±0.2	20	61
BGY51	12.5 ±0.4	0.2–0.8	±0.2	20	63,5
BGY52	16.4 ±0.4	0–1	±0.1	20	61
BGY53	16.4 ±0.4	0–1	±0.1	20	63,5
BGY54	17.0 ±0.4	0–1	±0.1	20	61
BGY55	17.0 ±0.4	0–1	±0.1	20	63,5
BGY56	22.0 ±0.6	0–1	±0.2	20	61,5
BGY57	22.0 ±0.6	0–1	±0.2	20	64
BGY58	33.0 ±1.0	0.5–1.5	±0.3	20	64
BGY58A8)	34.0 ±1.0	0.5–1.5	±0.3	20	64
BGY59	38.5 ±1.0	0–1.5	±0.3	18	64
BGY607)	33.5 ±1.0	0.5–1.5	±0.3	18	64

For note see next page.

General remarks

Source & load impedance of all devices = 75 Ω

Characteristics of all devices specified at T_{mb} = 30 °C

For further information please consult the relevant data sheet.

For detailed information on these and other types see Data Handbook S10

2nd order beat		composite triple beat	cross–modulation	max noise figure	total d.c. current consumption		type
dB	dB	dB	dB	dB*	mA[6]		
40 to 300 (330) MHz frequency range (cont.)							
max	–	32 chs[4]	32 chs[4]		typ	max	
−71[2]	–	−65	−60	7.0	160	180	**BGY50**
−73[2]	–	−67	−65	8.0	200	220	**BGY51**
−71[2]	–	−65	−60	6.0	160	180	**BGY52**
−73[2]	–	−67	−65	7.0	200	220	**BGY53**
−71[2]	–	−65	−60	6.0	160	180	**BGY54**
−73[2]	–	−67	−65	7.0	200	220	**BGY55**
−64[1]	–	−64	−59	6.0	160	180	**BGY56**
−66[1]	–	−66	−62	7.0	200	220	**BGY57**
−68[1]	–	−67	−65	6.0	320	340	**BGY58**
−70[2]	–	−67	−65	6.0	320	340	**BGY58A**[8]
−68[1]	–	–	–	6.0	320	340	**BGY59**
−66[1]	–	−67	−65	6.0	320	340	**BGY60**[7]

Notes:

* over operating frequency range

[1] V_o = 50 dBmV, f_p = 66 MHz, V_o = dBmV, f_q = 144 MHz; measured at $f_{(p+q)}$ = 210 MHZ

[2] V_o = 50 dBmV: ch 2; V_o = 50 dBmV: ch 13; measured in ch R

[3] V_o = 50 dBmV: ch G; V_o = 50 dBmV: ch N; measured in ch H14

[4] V_o = 46 dBmV measured in ch W

[5] intermodulation distortion = −60 dB (DIN 45004, para. 6.3: 3 tone) $V_p = V_o$; f_p = 287,25 MHz; $V_q = V_o - 6$dB; f_q = 294.25 MHz; $V_r = v_o$–6dB; f_r = 296.25 MHz; measured at $f_{(p+q-r)}$ = 285.25 MHz

[6] measured at 24 V d.c. supply

[7] interstage amplifier module

[8] BGY58A has operating frequency range from 40–330 MHz

Wideband modules for CATV (cont.)

For detailed information on these and other types see Data Handbook S10

type	status	power gain dB	slope (cable equivalent) dB[1]	max flatness dB[1]	min return loss (input/output) dB	min output–voltage dBmV	
40 to 450 MHz frequency range (high dynamic range)							
		at 50 MHz			dB[13]	dBmV[10]	
BGY80		12.5 ±0.4	0.2–1.5	±0.2	18	61.5	
BGY81		12.5 ±0.4	0.2–1.5	±0.2	18	64	
BGY84	C	17.0 ±0.4	0.3–1.5	±0.2	18	60	
BGY84A	C	18.4 ±0.4	0.3–1.5	±0.2	18	60	
BGY84H	C	14.5–16.3	4.7–5.5	±0.2	18	61.5	
BGY85	C	17.0 ±0.4	0.3–1.5	±0.2	18	62.5	
BGY85A	C	18.4 ±0.4	0.3–1.5	±0.2	18	62.5	
BGY85H	C	14.5–16.3	4.7–5.5	±0.2	18	62.5	
BGY86	C	22.0 ±0.5	0.2–1.5	±0.2	18	60.0	
BGY87	C	22.0 ±0.5	0.2–1.5	±0.2	18	62.5	
BGY88	C	34.5 ±1.0	0.5–2.5	±0.3	18	62	
Power doublers – 40 to 450 MHz frequency range							
		at 50 MHz			dB	dBmV[10]	
BGD102	C	18.5 ±0.5	0.5–2.5	±0.3	18	–	
BGD104	C	20.0 ±0.5	0.5–2.5	±0.3	18	–	
BGD102E	C	18.5 ±0.5	0.5–2.0	±0.3	18[13]	65	
BGD104E	C	20.0 ±0.5	0.5–2.0	±0.3	18[13]	64.5	
40 to 550 MHz frequency range							
		at 50 MHz			dB	dBmV[10]	
BGY580		12.5 ±0.4	0.5–2.0	±0.2	18	59	
BGY581		12.5 ±0.4	0.5–2.0	±0.3	18	61.5	
BGY584	–	17.2 ±0.5	0.5–2.0	±0.2	18	–	
BGY584A	C	18.2 ±0.5	0.5–2.0	±0.2	18[13]	59.0	
BGY585	–	17.2 ±0.5	0.5–2.0	±0.2	18	–	
BGY585A	C	18.2 ±0.5	0.5–2.0	±0.2	18[13]	61.5	
BGY586	C	22.0 ±0.5	0.5–2.0	±0.2	18	58.5	
BGY587	C	22.0 ±0.5	0.5–2.0	±0.2	18	61.0	
BGY588	–	34.5 ±1.0	0.5–2.5	±0.3	16	–	

For notes see page S132

Wideband modules for CATV (cont.)

For detailed information on these and other types see Data Handbook S10

2nd order beat dB	dB	max composite triple beat dB	max cross-modulation dB	max noise figure dB[1]	total d.c. current consumption[4] mA	mA	max r.f. input voltage dBmV	type
40 to 450 MHz frequency range (high dynamic range) cont.								
typ[2]	max[3]	60 chs[5]	60 chs[6]		typ	max		
–	−72	−58	−59	8.0	180	200	65	**BGY80**
–	−74	−61	−62	9.0	220	240	65	**BGY81**
−80	−70	−55	−57	6.5	180	200	65	**BGY84**
−80	−72	−55	−58	6.5	180	200	65	**BGY84A**
–	−72	−59	−59	7.0	220	240	–	**BGY84H**
−80	−70	−58	−60	7.0	220	240	65	**BGY85**
−80	−72	−59	−61	7.0	220	240	65	**BGY85A**
	−72	−59	−61	7.0	220	240	–	**BGY85H**
	−68	−56	−55	6.0	180	200	60	**BGY86**
	−72	−60	−59	7.0	220	240	60	**BGY87**
−80	−70	−58	−59	6.0	320	340	55	**BGY88**
Power doublers – 40 to 450 MHz frequency range, cont.								
	max[3]	60 chs[5]	60 chs[6]		typ	max		
–	−73	−65	−67	7.0	415	435	65	**BGD102**
–	−73	−64	−66	7.0	415	435	65	**BGD104**
–	−73	−65	−67	7.0	415	435	65	**BGD102E**
–	−73	−64	−66	7.0	415	435	65	**BGD104E**
40 to 550 MHz frequncy range, cont.								
	max[14]	77 chs[15]	77 chs[16]		typ	max		
–	−70	−56	−59	8.0	180	200	–	**BGY580**
–	−72	−59	−62	9.0	220	240	–	**BGY581**
	−68	−56	−59	7.0	180	200	60	**BGY584**
–	−70	−56	−59	7.0	180	200	60	**BGY584A**
–	−70	−59	−62	8.0	220	240	60	**BGY585**
–	−72	−59	−62	8.0	210	240	60	**BGY585A**
–	−62	−53	−55	6.5	180	200	60	**BGY586**
–	−66	−57	−59	7.0	220	240	60	**BGY587**
–	−68	−57	−59	6.5	320	340	–	**BGY588**

For notes see page S132

For detailed information on these and other types see Data Handbook S10

type	status	power gain dB	slope (cable equivalent) dB$^{1)}$	max flatness dB$^{1)}$	min return loss (input/output) dB	min output–voltage dBmV	
Power doubler – 40 to 550 MHz frequency range							
		at 50 MHz			dB		
BGD502	C	18.5 ±0.5	0.2–2.2	±0.3	18$^{13)}$	64.0	
BGD504	C	20.0 ±0.5	0.2–2.0	±0.3	18	63.5	
40 to 860 MHz frequency range.							
		at 50 MHz			dB		
BGX885	–	17.0 ±0.5	0.2–1.2	±0.3	20	61.0	
Reverse amplifiers – 5 to 200 MHz frequency range							
		at 10 MHz			dB$^{1)}$	dBmV$^{11)}$	dBmV$^{12)}$
BGY61	C	13.0 ±0.5	−0.2 – +0.5	±0.2	20	67	64
BGY65	C	18.5 ±0.5	−0.2 – +0.5	±0.2	20	67	64
BGY67	C	22.0 ±0.5	−0.2 – +0.5	±0.2	20	67	64
BGY67A	C	24.0 ±0.5	−0.2 – +0.5	±0.2	20	67	64

For notes see page S132

For detailed information on these and other types see Data Handbook S10

2nd order beat		max composite triple beat	max cross-modulation	max noise figure	total d.c. current consumption[4]		max r.f. input voltage	type
dB	dB	dB	dB	dB[1]	mA	mA	dBmV	
Power doubler – 40 to 550 MHz frequency range, cont.								
	max[14]	77 chs[15]	77 chs[16]		typ	max		
–	−73	−65	−68	8.0	415	435	60	**BGD502**
–	−70	−64	−67	8.0	415	435	60	**BGD504**
40 to 860 MHz frequency range.								
	max[14]	77 chs[15]	77 chs[16]		typ	max		
–	−53	–	–	8.0	220	240	60	**BGX885**
Reverse amplifiers – 5 to 200 MHz frequency range, cont.								
	max[8]	22 chs[7]	22 chs[9]		typ	max		
–	−72	−68	−61	7.0	200	230	67	**BGY61**
–	−72	−68	−61	5.5	200	230	65	**BGY65**
–	−67	−67	−60	5.5	200	230	63	**BGY67**
–	−67	−67	−59	5.5	200	230	63	**BGY67A**

For notes see page S132.

For detailed information on these and other types see Data Handbook S10

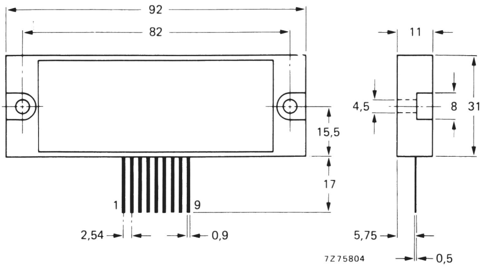
General remarks
Source & load impedance of all devices = 75 Ω
Characteristics of power doubler specified at T_{mb} = 35 °C
Characteristics of other devices specified at T_{mb} = 30 °C
For further information please consult the relevant data sheet.

Notes:

1) over operating frequency range
2) V_o = 50 dBmV: ch 2; V_o = 50 dBmV: ch 13; measured in ch R
3) V_o = 46 dBmV; ch 2; V_o = 46 dBmV: ch H5; measured in ch H14
4) measured at 24 V d.c. supply
5) V_o = 46 dBmV measured in ch H22
6) V_o = 46 dBmV measured in channel 2
7) V_o = 50 dBmV measured in ch 7
8) V_o = 50 dBmV at 90 MHz; V_o = 50 dBmV at 100 MHz; measured at 190 MHz
9) V_o = 50 dBmV measured in channel 2
10) intermodulation –60dB; (DIN 45004, para. 6.3: 3 tone); $V_p = V_o$; f_p = 440.25 MHz; $V_q = V_o - 6$dB; f_q = 447,25 MHz; $V_r = V_o - 6$dB; f_r = 449.25 MHz; measured at f_{p+q-r} = 438.25 MHZ
11) as 10) but with f_p = 35,25 MHz; f_q = 42.25 MHz; f_r = 44.25; $f_{(p+q-r)}$ = 33.25 MHz
12) as 10) but with f_p = 187,25 MHz; f_q = 194.25 MHz; f_r = 196.25 MHz; $f_{p+q-r)}$ = 185.25 MHz
13) min. 20dB from 40–80 MHz; min. 19dB from 80–160 MHz; min. 18dB from 160–450 MHZ; (550 MHz)
14) V_o = 44 dBmV, ch 2; V_o = 44 dBmV, ch 18; measured in ch 27
15) measured in channel 27 with V_o = 44 dBmV
16) measured in channel 2 with V_o = 44 dBmV

L.F. power modules

For detailed information on these and other types see Data Handbook S4a



92
82
11
4,5
8
31
15,5
17
1
9
2,54
0,9
5,75
0,5
7Z75804

	P_o at $d_{tot} < 0,2\%$		d_{tot} at
type	$R_L = 4\ \Omega$	$R_L = 8\ \Omega$	$D_o = 1$ W; f = 1 kHz
OM931	> 30 W at ±23 V	> 30 W at ±26 V	typ. 0.02%
OM961	> 60 W at ±31 V	> 60 W at ±35 V	typ. 0.02%
OM991	> 120 W at ±45 V	> 120 W at ± 50 V	typ. 0.02%

General data
Wideband modules

For detailed information on these and other types see Data Handbook S10

Frequency range	40 to 860 MHz
Source and load (characteristic) imp.	75 Ω
Operating ambient temperature	−20 to +70 °C
Operating mounting–base temperature: (OM323; A and OM337; A)	−30 to +100 °C
Pinning (except OM322)	suitable for 0.1–inch grid
Finish	resin coated

Conversion table for 75 Ω impedance

dBμV	mV	dBm
92	39.8	−16.75
98	79.4	−10.75
103	141.3	−5.75
105	177.8	−3.75
112	398.1	+3.25
113	446.7	+4.25

Typical characteristics at V_B = 24 V ±10%

type	gain $\|sf\|^2$ dB	V_o(rms)* dBμV	supply current mA	noise figure dB	max VSWR typical values		dimensions	
					input	output	L mm	H mm
OM320	15.5	92	23	5.5	2.2	2.5	30	12
OM321	15.5	98	33	6	2.5	2	30	12
OM322	15	103	60	7	1.7	1.7	–	–
OM323; A**	15	113	100	9	1.9	2.3	30	18
OM335	27	98	35	5.5	1.9	3.2	30	18
OM336	22	105	65	7	1.4	1.6	30	19
OM337; A**	26	112	115	9.8	2.3	1.8	30	18
OM339	28	105	67	6	1.5	1.5	30	19

Improved design techniques for h.f. performance resulted in reduced dimensions of the 12 V range.

Typical characteristics at V_B = 12 V ±10%

OM345	12	99	11.5	5.5	2.0	1.4	14	8
OM350	18	100	18	6	1.5	1.9	19	9
OM360	23	105	55	7	1.3	1.5	27	9
OM361	28	105	50	6	1.5	1.7	27	9
OM370	28	112	105	7	2.3	1.9	27	22
OM2045	12	99	11.5	3.6	2.0	1.4	14	8
OM2050	18	100	18	5.2	1.5	1.9	19	9
OM2060	23	105	55	5.4	1.3	1.5	27	9
OM2061	28	105	50	4.4	1.5	1.7	27	9
0M2070	28	112	105	4.8	2.3	1.9	27	22

* Min. output voltage at −60 dB intermodulation distortion (DIN 45004, par. 6.3: 3–tone, f = 470 MHz).

** The OM323A and OM337A need an external collector coil and output capacitor, the OM323 and OM337 have these built–in.

Inductive proximity detectors

For detailed information on these and other types see Data Handbook S13

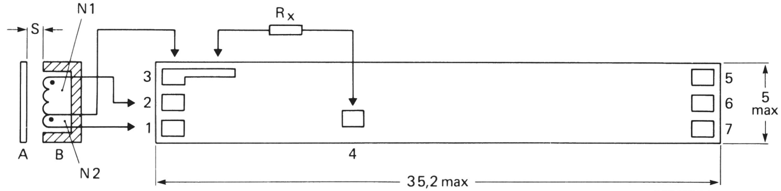
D.C. supply voltage range	4.5 to 30 V
Output current at $V_B = 24$ V	max. 250 mA
Switching distance; depends on R_x and oscillator coil	typ. 1 to 5 mm
Hysteresis in switching distance	3 to 10%
Operating frequency	< 5 kHz
Operating substrate temperature range	−40 to +85 °C

Hybrid integrated circuits intended for inductive proximity detectors in tubular construction, especially the M8 hollow stud. The OM286 and OM286M are for positive and the OM287 and OM287M are for negative supply voltage. The circuit consists of an oscillator, a rectifier stage, a Schmitt trigger and an output stage.
The circuit performs a make function: when actuated the current flows trough the load, which can be, for example, the coil of an electromagnetic relay, a LED or a photocoupler.

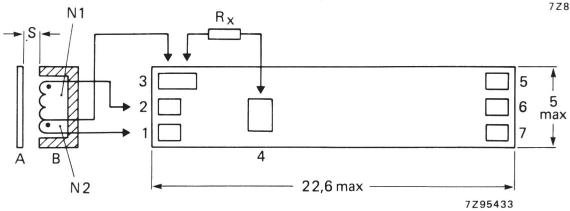
The output transistor is protected against transients from the inductive load by a voltage regulator diode. The circuit is protected against false polarity connection of the supply voltage.

The devices OM286/OM287 are thick–film circuits and the OM286M/OM287M are thin–film circuits deposited on ceramic substrates. They may be potted, together with the oscillator coil and a resistor (R_x), in a non–magnetic tube.

OM286/OM287



OM286M/OM287M



A = metal actuator
B = open potcore or potcore half with coil

Mechanical outline and connections. Note that the supply polarities to points 5 and 7 are given for the OM286 and OM286M; for OM287 and OM287M the polarities are point 5: $-V_B$ and point 7: $+V_B$.
S is the switching distance. The maximum height of the circuits including the substrate thickness is 1.7 mm.

type	supply voltage	technology
OM286	positive	thick film
OM286M	positive	thin film
OM287	negative	thick film
OM287M	negative	thin film

Inductive proximity detectors (cont.)

For detailed information on these and other types see Data Handbook S13

D.C. supply voltage range	10 to 30 V
Output current at V_B = 10 to 30 V	max. 250 mA
Switching distance; depends on R_x and oscillator coil	typ. 1 to 5 mm
Hysteresis is switching distance	3 to 10%
Operating frequency	< 5 kHz
Operating substrate temperature range	−40 to +85 °C

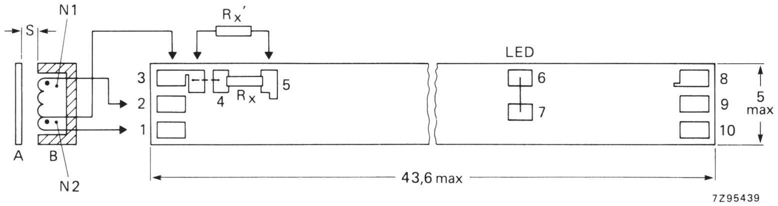
Hybrid integrated circuits intended for inductive proximity detectors in tubular construction, especially the M8 hollow stud. The OM386B is for positive supply voltage and the OM387B is for negative supply voltage. The circuit consists of a voltage regulator, an oscillator, a rectifier stage, a Schmitt trigger, an output stage and a protection circuit.

The circuit performs a make function: when actuated the current flows through the load, which can be, for example, the coil of an electromagnetic relay, a LED or a photocoupler.

Features

- protection against short–circuit and overload
- protection of output transistor against transients by a voltage regulator diode
- protection against false polarity of the three connection leads
- choice between two methods to adjust the operating (switching) distance, i.e. trimming a resistor integrated on the substrate or mounting a resistor
- possibility of connecting a LED for function control

The devices are thin–film circuits deposited on ceramic substrates. They may be potted, together with the oscillator coil, in a non–magnetic tube.



A = metal actuator
B = open potcore or potcore half with coil

Mechanical outline and connections. Note that the supply polarities to points 8 and 10 are given for the OM386; for OM387 the polarities are point 8: $-V_B$ and point 10: $+V_B$.
S is the switching distance. The maximum height of the circuits including the substrate thickness is 1.7 mm.

type	supply voltage
OM386B	positive
OM387B	negative

For detailed information on these and other types see Data Handbook S13

D.C. supply voltage range	10 to 30 V
Output current at V_B = 10 to 30 V	max. 200 mA
Switching distance; depends on R_x and oscillator coil	typ. 1 to 5 mm
Hysteresis is switching distance	3 to 10%
Operating frequency	< 5 kHz
Operating substrate temperature range	−40 to +85 °C

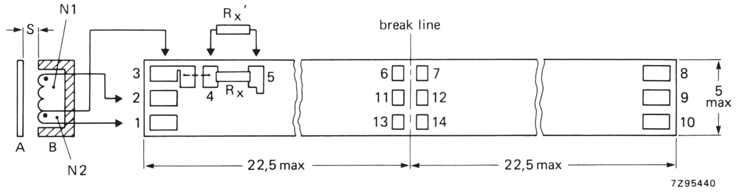
Hybrid integrated circuits intended for inductive proximity detectors in tubular construction, especially the M8 hollow stud. The OM386M is for positive supply voltage and the OM387M is for negative supply voltage. The circuit consists of a voltage regulator, an oscillator, a rectifier stage, a Schmitt trigger, an output stage and a protection circuit.

The circuit performs a make function: when actuated the current flows through the load, which can be, for example, the coil of an electromagnetic relay, a LED or a photocoupler. Compared to the types OM386B/OM387B the substrate length is drastically reduced.

Features

- extra small dimensions
- protection against short–circuit and overload
- protection of output transistor against transients by a voltage regulator diode
- protection against false polarity of the three connection leads
- choice between two methods to adjust the operating (switching) distance i.e. trimming a resistor integrated on the substrate or mounting a resistor
- possibility of connecting a LED for function control

The devices are thin–film circuits deposited on ceramic substrates. They may be potted, together with the oscillator coil, in a non–magnetic tube.



Mechanical outline and connections. The supply polarities to points 8 and 10 are given for the OM386; for OM387 the polarities are point 8: $-V_B$ and point 10: $+V_B$. S is the switching distance. The thickness of assembled hybrid (two parts glued together back to back) is max. 3.8 mm.

type	supply voltage
OM386M	positive
OM387M	negative

For detailed information on these and other types see Data Handbook S13

D.C. supply voltage range	10 to 30 V
Output current at V_B = 10 to 30 V	max. 250 mA
Switching distance; depends on R_x and oscillator coil	typ. 2 to 5 mm
Hysteresis is switching distance	3 to 10%
Operating frequency	< 5 kHz
Operating substrate temperature range	−40 to +85 °C

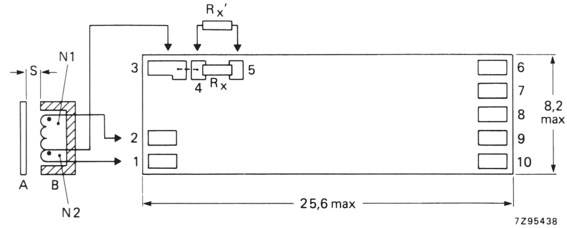
Hybrid integrated circuits intedended for inductive proximity detectors in tubular construction, especially the M12 hollow stud. The OM388B is for positive supply voltage and the OM389B is for negative supply voltage. The circuit consists of a voltage regulator, an oscillator, a rectifier stage, a Schmitt trigger, an output stage and a protection circuit.

The circuit performs a make function: when actuated the current flows through the load, which can be, for example, the coil of an electromagnetic relay, a LED or a photocoupler.

Features

- protection against short–circuit and overload
- protection of output transistor against transients by a voltage regulator diode
- protection against false polarity of the three connection leads
- choice between two methods to adjust the operating (switching) distance i.e. trimming a resistor integrated on the substrate or mounting a resistor
- possibility of connecting a LED for function control

The devices are thin–film circuits deposited on ceramic substrates. They may be potted, together with the oscillator coil, in a non–magnetic tube.



A = metal actuator
B = open potcore or
potcore half with coil

Mechanical outline and connections. Note that the supply polarities to points 5 and 7 are given for the OM286; for OM287 the polarities are point 5: $-V_B$ and point 7: $+V_B$.
S is the switching distance. The maximum height of the circuits including the substrate thickness is 1.7 mm.

type	supply voltage
OM388B	positive
OM389B	negative

Inductive proximity detectors (cont.)

For detailed information on these and other types see Data Handbook S13

D.C. supply voltage range	10 to 30 V
Output current at V_B = 10 to 30 V	max. 250 mA
Switching distance; depends on R_x and oscillator coil	typ. 2 to 5 mm
Hysteresis is switching distance	3 to 10%
Operating frequency	< 5 kHz
Operating substrate temperature range	−40 to +85 °C

Hybrid integrated circuits intedended for inductive proximity detectors in tubular construction, especially the M18 hollow stud. The OM390 is for positive supply voltage and the OM391 is for negative supply voltage. The circuit consists of a voltage regulator, an oscillator, a rectifier stage, a Schmitt trigger, an output stage and a protection circuit.

The circuit performs a make function: when actuated the current flows through the load, which can be, for example, the coil of an electromagnetic relay, a LED or a photocoupler.

Features

- protection against short–circuit and overload
- protection of output transistor against transients by a voltage regulator diode
- protection against false polarity of the three connection leads
- choice between two methods to adjust the operating (switching) distance i.e. trimming a resistor integrated on the substrate or mounting a resistor
- possibility of connecting a LED for function control

The devices are thin–film circuits deposited on ceramic substrates. They may be potted, together with the oscillator coil, in a non–magnetic tube.

A = metal actuator
B = open potcore or
potcore half with coil
S = the operating distance

type	supply voltage
OM390	positive
OM391	negative

Customized product capabilities

- Impartial advice for customers to choose between:
  pcb – Hybrid ICs – gate arrays or fully monolithic ICs
- Basic factory load guaranteed by standard catalogue hybrid modules
- Wide range of in–house surface mounted components and naked crystals
- Wide variety of application know–how
- Various factories with local or international approvals
  (e.g. CNET, CECC, AQUAP)
- Regular innovation of new technologies:
  High density with naked crystals
  Naked crystals in conformal coating
  Metallized via–holes
  Polyimide technology
  Full double–sided modules

Surface–mounting general purpose transistors

For detailed information on these and other types see Data Handbook S7

		ratings				characteristics				
P–N–P type	case*	V_{CBO} V	V_{CEO} V	I_C mA	P_{tot} mW	h_{FE} min/max	at I_C/V_{CE} mA/V	V_{CEsat} max V	at I_C/I_B mA	f_T typ MHz
BC807	SOT–23	45	45	500	310	100/600	100/1	0.70	500/50	100
BC808	SOT–23	25	25	500	310					
BC856	SOT–23	65	65	100	200	75/475	2/5	0.30	10/0.5	150
BC857	SOT–23	45	45	100	200	75/475	2/5	0.30	10/0.5	150
BC858	SOT–23	30	30	100	200	75/800	2/5	0.30	10/0.5	150
BC869	SOT–89	20	20	1000	1000	85/375	500/1	0.50	1000/100	60
BCV26	SOT–23	40	30	300	350	> 20000	100/5	1.0	100/0.1	220
BCV62	SOT–143	30	30	100	200	100/800	2/5	0.65	100/5	150
BCV63	SOT–143	30	30	100	300	100/900	2/5	0.65	100/5	200
BCV64	SOT–143	30	30	100	300	100/900	2/5	0.30	100/0.5	200
BCV65	SOT–143	30	30	100	300	75/800	2/5	0.30	10/0.5	100
BCW29	SOT–23	32	32	100	350	120/260	2/5	0.30	10/0.5	150
BCW30	SOT–23	32	32	100	350	215/500	2/5	0.30	10/0.5	150
BCW61A	SOT–23	32	32	200	150	120/220	2/5	0.25	10/0.25	180
BCW61B	SOT–23					180/310				
BCW61C	SOT–23					250/460				
BCW61D	SOT–23					380/630				
BCW69	SOT–23	50	45	100	350	120/260	2/5	0.30	10/0.5	150
BCW70	SOT–23	50	45	100	350	120/500				
BCW89	SOT–23	80	60	100	350	120/260				
BCX17	SOT–23	50	45	500	425	100/600	100/1	0.62	500/50	100
BCX18	SOT–23	30	25	500	425					
BCX51	SOT–89	45	45	1000	1000	40/250	150/2	0.50	500/50	50
BCX52	SOT–89	60	60			40/160				
BCX53	SOT–89	100	80			40/160				
BCX71G	SOT–23	45	45	200	150	120/220	2/5	0.25	10/0.25	180
BCX71H	SOT–23	45	45	200	150	180/310	2/5	0.25	10/0.25	180
BCX71J	SOT–23					250/460				
BCX71K	SOT–23					380/630				
PMBTA55	SOT–23	60	60	500	300	50	10/1	0.25	100/10	50
PMBTA56	SOT–23	80	80	500	300	50	10/1	0.25	100/10	50
PMBTA63	SOT–23	30	30	500	300	5000	10/5	1.5	100/0.1	125
PMBTA64	SOT–23	30	30	500	300	10000	10/5	1.5	100/0.1	125

* Reverse–pinning types are available upon request for some SOT–23 encapsulated types

Surface–mounting general purpose transistors (cont.)

For detailed information on these and other types see Data Handbook S7

		ratings				characteristics				
N–P–N type	case*	V_{CBO} V	V_{CEO} V	I_C mA	P_{tot} mW	h_{FE} min/max	at I_C/V_{CE} mA/V	V_{CEsat} max V	at I_C/I_B mA	f_T typ MHz
BC817	SOT–23	45	45	500	310	100/600	100/1	0.70	500/50	200
BC818	SOT–23	25	25	500	310					
BC846	SOT–23	65	65	100	200	220/800	2/5	0.25	10/0.5	300
BC847	SOT–23	45	45	100	200					
BC848	SOT–23	30	30	100	200					
BC868	SOT–89	20	20	1000	1000	85/375	500/1	0.50	1000/100	60
BCV27	SOT–23	40	30	300	350	> 20000	100/5	1.0	100/0.1	220
BCV61	SOT–143	30	30	100	200	100/800	2/5	0.60	100/5	300
BCV71	SOT–23	80	60	100	350	110/220	2/5	0.25	10/0.5	300
BCV72	SOT–23	80	60	100	350	200/450	2/5	0.25	10/0.5	300
BCW31	SOT–23	32	32	100	350	110/220	2/5	0.25	10/0.5	300
BCW32	SOT–23					200/450				
BCW33	SOT–23					420/800				
BCW60A	SOT–23	32	32	200	150	120/220	2/5	0.35	10/0.25	250
BCW60B	SOT–23	32	32	200	150	180/310	2/5	0.35	10/0.25	250
BCW60C	SOT–23					250/460				
BCW60D	SOT–23					380/630				
BCW71	SOT–23	50	45	100	350	110/220	2/5	0.25	10/0.5	300
BCW72	SOT–23					220/450				
BCW81	SOT–23	50	45	100	350	450/800	2/5	0.25	10/0.5	300
BCX19	SOT–23	50	45	500	425	100/600	100/1	0.62	500/50	200
BCX20	SOT–23	30	25							
BCX54	SOT–89	45	45	1000	1000	45/250	150/2	0.50	500/50	130
BCX55	SOT–89	60	60			40/160				
BCX56	SOT–89	100	80			40/160				
BCX70G	SOT–23	45	45	200	150	120/220	2/5	0.35	10/0.25	250
BCX70H	SOT–23					180/310				
BCX70J	SOT–23					250/460				
BCX70K	SOT–23	45	45	200	150	380/630	2/5	0.35	10/0.25	250
PMBT6428	SOT–23	60	50	200	350	250/600	–	0.2	10/0.5	300
PMBT6429	SOT–23	55	45	200	350	500/1250	–	0.2	10/0.5	300
PMBTA05	SOT–23	60	60	500	300	50	10/1	0.25	100/10	100
PMBTA06	SOT–23	80	80	500	300	50	10/1	0.25	100/10	100
PMBTA13	SOT–23	30	30	300	300	5000	10/5	1.5	100/0.1	125
PMBTA14	SOT–23	30	30	300	300	10000	10/5	1.5	100/0.1	125

* Reverse–pinning types are available upon request for some SOT–23 encapsulated types

Surface–mounting h.f. and wideband transistors

For detailed information on these and other types see Data Handbook S7 and S10

High frequency transistors

		ratings				characteristics					
type	case*	V_{CBO} V	V_{CEO} V	I_C mA	P_{tot} mW	h_{FE} min/max	at I_C/V_{CE} mA/V	F typ dB	at f MHz	f_T typ MHz	C_{re} typ pF
P–N–P											
BF550	SOT–23	40	40	25	200	50/–	1/10	2	0.1	325	0.5
BF569	SOT–23	40	35	30	200	25/–	3/10	4.5	800	900	0.33
BF579	SOT–23	20	20	25	150	20/–	10/10	4.5	800	1350	0.46
BF660	SOT–23	40	30	25	200	30/–	3/10	–	–	650	0.65
BF767	SOT–23	30	30	20	200	15/–	3/10	4	800	900	0.30
BF824	SOT–23	30	30	25	300	25/–	4/–	3	100	450	0.1
N–P–N											
BF570	SOT–23	40	15	100	300	> 40	10/1	–	–	> 490	1.6
BF840	SOT–23	40	40	25	300	70/220	1/10	1.5	0.2	300	0.27
BF841	SOT–23	40	40	25	300	40/125	1/10	2	0.2	300	0.27
BFS18	SOT–23	30	20	30	250	35/125	1/10	4	100	200	0.85
BFS19	SOT–23	30	20	30	250	65/225	1/10	4	100	260	0.85
BFS20	SOT–23	30	20	25	250	40/85	7/10	–	–	450	0.35

Wideband transistors

		ratings				characteristics					
type	case*	V_{CBO} V	V_{CEO} V	I_C mA	P_{tot} mW	h_{FE} min/max	at I_C/V_{CE} mA/V	d_{im} typ dB	at f MHz	f_T typ GHz	C_{re} typ pF
P–N–P											
BFT92	SOT–23	20	15	25	200	20/–	14/10	60	493.25	5	0.7
BFT93	SOT–23	15	12	35	200	20/–	30/5	60	493.25	5	1.0
N–P–N											
BFG67	SOT–143	20	10	50	300	60/100	15/5	2.5	2000	7500	0.5
BFQ17	SOT–89	40	25	150	1000	25/–	150/5		–	1.2	1.9
BFQ18A	SOT–89	25	15	150	1000	25/–	100/10	60	793.25	3.6	1.2
BFQ19	SOT–89	20	15	75	500	25/–	75/10		–	5.0	1.3
BFQ67	SOT–23	20	10	50	300	60/–	15/5			7.5	0.5
BFR53	SOT–23	18	10	50	250	25/–	50/5	60	217.0	2.0	0.9
BFR92	SOT–23	20	15	25	200	25/–	14/10	60	493.25	5.0	0.7
BFR92A	SOT–23	20	15	25	200	40/–	14/10	60	793.25	5.0	0.35
BFR93	SOT–23	15	12	35	200	25/–	30/5	60	493.25	5.0	0.8
BFR93A	SOT–23	15	12	35	250	40/–	30/5	60	793.25	5.0	0.6
BFS17	SOT–23	25	15	25	250	20/150	2/1	45	217	1.3	0.65
BFS17A	SOT–23	25	15	25	300	20/150	2/1	–	–	2.8	–
BFT25	SOT–23	8	5	2.5	50	20/–	1/1		–	2.3	0.45

* Reverse–pinning types are available upon request for some SOT–23 encapsulated types

Surface–mounting switching transistors

For detailed information on these and other types see Data Handbook S7

		ratings				characteristics					
type	case*	V_{CBO} V	V_{CEO} V	I_C mA	P_{tot} mW	h_{FE} min/max	at I_C/V_{CE} mA/V	V_{CEsat} max V	at I_C/I_B mA/mA	t(max) on/off ns	at I_C/I_B mA
P–N–P											
BSR12	SOT–23	15	15	100	250	30/120	50/1	0.45	100/10	20/30	30/3
BSR15	SOT–23	60	40	600	425	100/300	150/10	1.6	500/50	45/100	150/15
BSR16	SOT–23	60	60	600	425	100/300	150/10	1.6	500/50	45/100	150/15
BSR18	SOT–23	40	40	200	250	50/150	10/1	0.40	50/5	70/250	10/1
BSR18A	SOT–23	40	40	200	250	100/300	10/1	0.4	50/5	70/300	10/1
BSR20	SOT–23	130	120	–	–	40/180	10/5	0.25	50/5	–	–
BSR20A	SOT–23	100	150	–	–	50/240	10/5	0.2	50/5	–	–
BSR30	SOT–89	70	60	1000	1000	40/120	100/5	0.5	500/50	500/650	100/5
BSR31	SOT–89	70	60	1000	1000	100/300	100/5	0.5	500/50	500/650	100/5
BSR32	SOT–89	90	80	1000	1000	40/120	100/5	0.5	500/50	500/650	100/5
BSR33	SOT–89	90	80	1000	1000	100/300	100/5	0.5	500/50	500/650	100/5
BSS63	SOT–23	110	100	100	350	30/–	25/1	0.25	25/2.5	–	–
BST60	SOT–89	60	45	500	1000	1000/–	150/10	1.3	500/0.5	400/1500	500/0.5
BST61	SOT–89	80	60	500	1000	1000/–	150/10	1.3	500/0.5	400/1500	500/0.5
BST62	SOT–89	100	80	500	1000	1000/–	150/10	1.3	500/0.5	400/1500	500/0.5
PMBT2907	SOT–23	60	40	600	350	30/–	500/10	0.4	150/15	45/100	150/15
PMBT2907A	SOT–23	60	60	600	350	30/–	500/10	0.4	150/15	45/100	150/15
PMBT3906	SOT–23	40	40	200	300	100/300	0.25	10/1			
PXT3906	SOT–89	40	40	200	1000	100/300	10/1	0.25	10/1	35/35	10/1
N–P–N											
BSR13	SOT–23	60	30	800	425	100/300	150/10	1.6	500/50	35/285	150/–
BSR14	SOT–23	75	40	800	425	100/300	150/10	1.0	500/50	35/285	150/–
BSR17	SOT–23	60	40	200	350	50/150	10/1	0.3	50/5	70/225	10/1
BSR17A	SOT–23	60	40	200	350	100/300	10/1	0.3	50/5	70/250	10/1
BSR19	SOT–23	160	140	600	300	60/250	10/5	0.25	50/5	–	–
BSR19A	SOT–23	180	160	600	300	80/250	10/5	0.2	50/5	–	–
BSR40	SOT–89	70	60	1000	1000	40/120	100/5	0.5	500/50	250/1000	100/5
BSR41	SOT–89	70	60	1000	1000	100/300	100/5	0.5	500/50	250/1000	100/5
BSR42	SOT–89	90	80	1000	1000	40/120	100/5	0.5	500/50	250/1000	100/5
BSR43	SOT–89	90	80	1000	1000	100/300	100/5	0.5	500/50	250/1000	100/5
BSS64	SOT–23	120	80	100	350	20/80	10/1	0.2	50/15	/1000	15/1
BSV52	SOT–23	20	12	100	250	40/120	10/1	0.2	50/5	12/18	10/3
BST50	SOT–89	60	45	500	1000	1000/–	150/10	1.3	500/50	400/1500	500/0.5
BST51	SOT–89	80	60	500	1000	1000/–	150/10	1.3	500/50	400/1500	500/0.5
BST52	SOT–89	100	80	500	1000	1000/–	150/10	1.3	500/50	400/1500	500/0.5
PMBT2222	SOT–23	60	30	600	350	100/300	150/10	0.4	150/15	35/285	150/–
PMBT2222A	SOT–23	75	40	600	350	100/300	150/10	0.3	150/15	35/285	150/–
PMBT3903	SOT–23	60	40	200	300	20/150	0.3	50/5	70/225		
PMBT3904	SOT–23	60	40	200	300	40/300	0.3	50/5	70/250		
PXT3904	SOT–89	60	40	200	1000	100/300	10/1	0.2	10/1	35/35	10/1

* Reverse–pinning types are available upon request for some SOT–23 encapsulated types

Surface–mounting general low noise and h.v. transistors

For detailed information on these and other types see Data Handbook S7

Low noise transistors ($F < 4$ dB at f = 1kHz; B = 200 Hz)

		ratings				characteristics				
type	case	V_{CBO} V	V_{CEO} V	I_C mA	P_{tot} mW	h_{FE} min/max at	I_C/V_{CE} mA/V	V_{CEsat} max at V	I_C/I_B mA	f_T typ MHz
P–N–P										
BC859	SOT–23	30	30	100	200	125/800	2/5	0.3	10/0.5	150
BC860	SOT–23	45	45	100	200	125/800	2/5	0.3	10/0.5	150
BCF29	SOT–23	32	32	100	350	120/260	2/5	0.3	10/0.5	150
BCF30	SOT–23	32	32	100	350	215/500	2/5	0.3	10/0.5	150
BCF70	SOT–23	50	45	100	350	215/500	2/5	0.3	10/0.5	150
N–P–N										
BC849	SOT–23	30	30	100	200	450/800	2/5	0.25	10/0.5	300
BC850	SOT–23	45	45	100	200					
BCF32	SOT–23	32	32	100	350	200/450	2/5	0.25	10/0.5	300
BCF33	SOT–23	32	32	100	350	420/800	2/5	0.25	10/0.5	300
BCF81	SOT–23	50	45	100	350	420/800	2/5	0.25	10/0.5	300

High voltage transistors

		ratings				characteristics				
type	case	V_{CBO} V	V_{CEO} V	I_C mA	P_{tot} mW	h_{FE} min/max at	I_C/V_{CE} mA/V	V_{CEsat} max at V	I_C/I_B mA	f_T min MHz
P–N–P										
BF621	SOT–89	300	–	20	1000	50/–	25/20	0.8	30/5	60
BF623	SOT–89	250	250	20	1000	50/–	25/20	0.8	30/5	60
BF821	SOT–23	300	–	50	310	50/–	25/20	0.8	30/5	60
BF823	SOT–23	250	250	50	310	50/–	25/20	0.8	30/5	60
BST15	SOT–89	200	200	1000	1000	30/150	50/10	2.5	50/5	15
BST16	SOT–89	350	300	1000	1000	30/120	50/10	2.0	50/5	15
PMBTA92	SOT–23	300	300	500	300	40/–	10/10	0.5	20/2	50
PMBTA93	SOT–23	200	200	500	300	40/–	10/10	0.5	20/2	50
N–P–N										
BF620	SOT–89	300	–	20	1000	50/–	25/20	0.6	30/5	60
BF622	SOT–89	250	250	20	1000	50/–	25/20	0.6	30/5	60
BF820	SOT–23	300	–	50	310	50/–	25/20	0.6	30/5	60
BF822	SOT–23	250	250	50	310	50/–	25/20	0.6	30/5	60
BST39	SOT–89	400	350	1000	1000	40/160	20/10	0.5	50/4	15
BST40	SOT–89	350	250	1000	1000	40/160	20/10	0.5	50/4	15
PMBTA42	SOT–23	300	300	500	310	40/–	30/10	0.5	20/2	50
PMBTA43	SOT–23	200	200	500	310	40/–	30/10	0.5	20/2	50

Surface–mounting FETs and trigger devices

For detailed information on these and other types see Data Handbook S7

For FET configurations see general data pages, beginning S100

P–and N–channel field effect transistors

			ratings				characteristics					
type	case	FET type (see notes)	± V_{DS} V	$-V_{GSO}$ V	I_D mA	P_{tot} mW	$-I_{GSS}$ max nA	I_{DSS} min/max mA	$-V_{(P)GS}$ max V	$\lvert Y_{fs}\rvert$ min mS	C_{RS} max pF	V_n max µV
BF510	SOT–23	(1)	20	–	10	250	10	0.7/3.0	0.8	2.5	0,4	–
BF511	SOT–23	(1)	20	–	10	250	10	2.5/7.0	1.5	4	0.4	–
BF512	SOT–23	(1)	20	–	10	250	10	6/12	2.2	6	0.4	–
BF513	SOT–23	(1)	20	–	10	250	10	10/18	3	7	0.4	–
BF989	SOT–143	(2)	20	–	20	200	50	2/20	2.7	9.5	0.025	–
BF990A	SOT–143	(2)	18	–	30	200	25	–	1.3	17	0.025	–
BF991	SOT–143	(2)	20	–	20	200	50	4/25	2.5	10	0.020	–
BF992	SOT–143	(2)	20	–	40	200	25	–	1.3	20	0.04	–
BF994S	SOT–143	(2)	20	–	–	300	50	4/20	2.5	15	–	–
BF996S	SOT–143	(2)	20	–	–	300	50	4/20	2.5	15	–	–
BF997	SOT–143	(2)	20	–	30	300	10	2/20	2.5	15	0.025	–
BFR30	SOT–23	(1)	25	25	10	250	0.2	4/10	5	1	1.5	0.5
BFR31	SOT–23	(1)						1/5	2.5	1.5	–	–
BFR101A	SOT–143	(1)	30	30	10	200	5	0.2/1.5	1.0	1.2	–	–
BFR101B	SOT–143	(1)	30	30	10	200	5	1/5	2.5	2.5	–	–
BFT46	SOT–23	(1)	25	25	10	250	0.2	0.2/1.5	1.0	1.0	1.5	0.5
BSD20	SOT–143	(4)	10	–	50	230	1.0	–	2.0	–	0.6	–
BSD22	SOT–143	(4)	20	–	50	230	1.0	–	2.0	–	0.6	–
BSR56	SOT–23	(3)	40	40	–	250	1	50/–	10	–	5	–
BSR57	SOT–23	(3)						20/100	6	–	–	–
BSR174	SOT–23	(7)	30	–	–	300	–	–	–	–	–	–
BSR175	SOT–23	(7)	30	–	–	300	–	–	–	–	–	–
BSR176	SOT–23	(7)	30	–	–	300	–	–	–	–	–	–
BSR177	SOT–23	(7)	30	–	–	300	–	–	–	–	–	–
BSR58	SOT–23	(3)						8/8000	4	–	–	–
BSS83	SOT–143	(4)	10	–	50	230	10	–	2.0	–	0.6	–
BST80	SOT–89	(5)	80	–	–	1000	100	500	3.5	–	–	–
BST82	SOT–23	(5)	80	–	–	250	100	175	3.5	–	–	–
BST84	SOT–89	(5)	200	–	–	1000	100	300	3.5	–	–	–
BST86	SOT–89	(5)	180	–	–	1000	100	300	2.7	–	–	–
BST120	SOT–89	(6)	60	–	–	1000	100	–	–	–	–	–
BST122	SOT–89	(6)	50	–	–	1000	100	–	–	–	–	–
PMBF4391	SOT–23	(3)	40	–	–	250	1	50	10	–	3.5	–
PMBF4392	SOT–23	(3)	40	–	–	250	1	25	5	–	3.5	–
PMBF4393	SOT–23	(3)	40	–	–	250	1	5	3	–	3.5	–

Trigger devices

P–N–P–N type	case	V_{GA} max V	I_A max mA	I_P µA	I_V µA
BRY61	SOT–23	70	175	5/1	30/50
BRY62	SOT–143	70	175	–	–

(1) n–channel junction FETs
(2) dual–gate n–channel MOS FETs
(3) n–channel junction FETs for switching
(4) n–channel MOS–FETs for switching
(5) n–channel vertical D–MOS FETs for switching
(6) p–channel vertical D–MOS FETs for switching
(7) p–channel junction FETS for switching

Surface–mounting diodes

For detailed information on these and other types see Data Handbook S1 and S7

- four encapsulations - SOT–23, SOT–89, SOT–143 and SOD–80, all suitable for wave and reflow soldering.
- unimetal bonding of SOT–23 switching diodes for long life
- avalanche diodes - BAS29, BAS31 and BAS 35
- SOD–80 is a hermetically sealed glass encapsulation
- performance and reliability of all types comparable to that of axial leaded DO–34 and DO–35 diodes (the same crystals are used)

General–purpose diodes

type	status	case	V_R V	I_F mA	t_{rr} ns	C_d pF	nearest conventional	configuration
BAS19	P	SOT–23	100	200	50	5	BAV19	
BAS20	P	SOT–23	150	200	50	5	BAV20	
BAS21	P	SOT–23	200	200	50	5	BAV21	
BAV23	C	SOT–143	200	200	50	5	2 x BAV21	two separate diodes
BAV100	P	SOD–80	50	250	50	5	BAV18	
BAV101	P	SOD–80	100	250	50	5	BAV19	
BAV102	P	SOD–80	150	250	50	5	BAV20	
BAV103	P	SOD–80	200	250	50	5	BAV21	
BAV105	P	SOD–80	60	300	6	2.5		

Switching diodes

type	status	case	V_R V	I_F mA	t_{rr} ns	C_d pF	nearest conventional	configuration
BAS32	P	SOD–80	75	200	4	2	IN4148	
BAS16	P	SOT–23	75	250	6	2	BAW62	
BAS29*	C	SOT–23	90	250	50	35	BAX12	
BAS31*	C	SOT–23	90	200	50	35	2 x BAX12	series–connected double diode
BAS35*	C	SOT–23	90	200	50	35	2 x BAX12	common–anode double diode
BAS28	P	SOT–143	70	250	4	1.5	2 x BAX12	two separate diodes
BAS56	C	SOT–143	60	200	6	2.5	BAV10	two separate diodes
BAV70	P	SOT–23	70	250	6	1.5	2 x BAW62	common–cathode double diode
BAV99	P	SOT–23	70	250	6	1.5	2 x BAW62	series–connected double diode
BAW56	P	SOT–23	70	250	6	2	2 x BAW62	common–anode double diode

Variable capacitance tuning diodes

type	status	case	V_R V	r_D Ω	C_d pF at	V_R V and	f MHz	C_d ratio at	V	nearest conventional
BBY31	P	SOT–23	28	1.2	1.8–2.8	25	1	typ. 5	3/25	BB405
BBY39	P	SOT–23	30	1.2	1.8–2.0	28	1	>7.6	1/28	–
BBY40	P	SOT–23	28	0.6	4.3–6	25	1	>5	3/25	BB809
BBY42	P	SOT–23	32	–	24 typ	3	1	1–16	1/28	–
BB215**	C	SOD–80	28	0.63	1.8–2.2	28	1	>7.6	1/28	BB405B
BB219**	C	SOD–80	28	0.7	2.6–3.2	28	1	>12	1/28	BB909

* avalanche diode
** available in matched sets
N.B. all values are maximum ones unless stated otherwise.

For detailed information on these and other types see Data Handbook S1 and S7

Band switching diodes

type	status	case	V_R V	I_F mA	r_D Ω at	I_F mA and	f MHz	C_d pF at	V_R V and	f MHz	nearest conventional
BA682	P	SOD–80	35	100	0.7	3	200	1.25	3	1	BA482
BA683	P	SOD–80	35	100	1.2	3	200	1.2	3	1	BA483
BAT18	P	SOT–23	35	100	0.7	5	200	1	20	1	BA482

Schottky–Barrier diodes

type	status	case	V_R V	I_F mA	V_F mV at	I_F mA	C_d pF at	V_R V and	f MHz	nearest conventional
BAT17	P	SOT–23	4	30	450	1	1	0	1	BA481
BAT54	C	SOT–23	30	200	400	10	10	0	1	BAT85
BAT74	C	SOT–143	30	200	400	10	10	0	1	BAT85
BAS85	P									

Voltage regulator diodes

series	status	case	V_Z E24 series V	V_Z tolerance	P_{tot} mW	nearest conventional
BZD27	P	SOD–87	7.5 to 510	5%	2500	BZD23
BZV49	P	SOT–98	2.4 to 75	5%	1000	BZV85
BZV55	P	SOD–80	2.4 to 75	5%	500	BZX79
BZX84	P	SOT–23	2.4 to 75	5%	300	BZX79
BZX84	C	SOT–23	2.4 to 75	2%	300	BZX79

Low voltage stabistor

type	status	case	V_F mV at	I_F mA	I_{FRM} mA	C_d pF at	V_R V and	f MHz	nearest conventional
BAS17	P	SOT–23	610–690	0.1	250	140	0	1	BA314
			680–760	1.0			0	1	
			750–830	10			0	1	
			870–960	100			0	1	

For detailed information on these and other types see Data Handbook S1 and S7

Controlled avalanche rectifier diodes

			ratings							
type	st.	case	$I_{F(AV)}$ A	V_{RWM} V	I_{FRM} A	I_{FSM} $T_{j\,max}$; $t = 10$ ms A	P_{RRM} and P_{RSM} $t = 20$ µs kW	kW	E_{RSM} mJ	nearest conventional
BYD17 **series**	P	SOD–87	1.5	200 to 800	5.5	20	–	–	7	BYD13

Very fast rectifier diodes

			ratings				characteristics		
type	st.	case	$I_{F(AV)}$ A	V_{RRM} V	I_{FRM} A	I_{FSM} $T_{j\,max}$; $t = 10$ ms A	t_{rr} max ns	$V_{F\,max}$ at I_F $T_j =$ 25 °C V/A	nearest conventional
BYD37 **series**	P	SOD–87	1.5	200 to 1000	7	20	250	1.3/1	BYD33

Ultra fast rectifier diodes

			ratings				characteristics		
type	st.	case	$I_{F(AV)}$ A	V_{RRM} V	I_{FRM} A	I_{FSM} $T_{j\,max}$; $t = 10$ ms A	t_{rr} max ns	$V_{F\,max}$ at I_F $T_j = 25$ °C V/A	nearest conventional
BYD77 **series**	P	SOD–87	2	50 to 400	15 to 30	25	25 to 50	0.95/1 1.95/1	BYD73

N.B. All values are maximum ones unless stated otherwise.

Surface–mounting devices: alphanumeric list

For detailed information on these and other types see Data Handbook S7

type number	case				marking		device type	nearest conventional	comple–ment
	SOT–23	SOT–89	SOT–143	SOD–80	type*	rev. type			
BA682				●	red band		diode	BA482	
BA683				●	red & or.		diode	BA483	
BAS16	●				A6		diode	BAW62, 1N4148	
BAS17	●				A91		diode	BA314	
BAS19	●				A8		diode	BAV19	
BAS20	●				A81		diode	BAV20	
BAS21	●				A82		diode	BAV21	
BAS28			●		A61		diode	2 x 1N4148	
BAS29	●				L20		diode	BAX12	
BAS31	●				L21		diode	2 x BAX12	
BAS32				●	black band		diode	1N4148	
BAS35	●				L22		diode	2 x BAX12	
BAS56			●		L51		diode	2 x BAV10	
BAT17	●				A3		diode	BA480	
BAT18	●				A2		diode	BA482	
BAT54	●						diode	BAT85	
BAT74			●				diode	2 x BAT85	
BAV23			●		L30		diode	2 x BAV21	
BAV70	●				A4		diode	2 x BAW62, 1N4148	
BAV99	●				A7		diode	2 x BAW62, 1N4148	
BAV100				●	gr. & bl.		diode	BAV18	
BAV101				●	gr. & br.		diode	BAV19	
BAV102				●	gr. & red		diode	BAV20	
BAV103				●	gr. & or.		diode	BAV21	
BAW56	●				A1		diode	2 x BAW62, 1N4148	
BB215				●	white & gr.		diode	BB405B	
BB219				●	white		diode	BB909	
BBY31	●				S1		diode	BB405	
BBY40	●				S2		diode	BB809	
BBY42	●				–		diode	–	
BC807–16	●				5A	5AR	PNP	BC327–16	BC817–16
BC807–25	●				5B	5BR	PNP	BC327–25	BC817–25
BC807–40	●				5C	5CR	PNP	BC327–40	BC817–40
BC808–16	●				5E	5ER	PNP	BC328–16	BC818–16
BC808–25	●				5F	5FR	PNP	BC328–25	BC818–25
BC808–40	●				5G	5GR	PNP	BC328–40	BC818–40
BC817–16	●				6A	6AR	NPN	BC337–16	BC807–16
BC817–25	●				6B	6BR	NPN	BC337–25	BC807–25
BC817–40	●				6C	6CR	NPN	BC337–40	BC807–40
BC818–16	●				6E	6ER	NPN	BC328–16	BC808–16
BC818–25	●				6F	6FR	NPN	BC328–25	BC808–25
BC818–40	●				6G	6GR	NPN	BC328–40	BC808–40
BC846A	●				1A	1AR	NPN	BC546A	BC856A

* or. = orange; gr. = green; bl. = black; br. = brown.

Surface–mounting devices: alphanumeric list

For detailed information on these and other types see Data Handbook S7

type number	case SOT–23	SOT–89	SOT–143	SOD–80	marking type	rev. type	device type	nearest conventional	comple–ment
BC846B	●				1B	1BR	NPN	BC546B	BC856B
BC847A	●				1E	1ER	NPN	BC547A, BC107A	BC857A
BC847B	●				1F	1FR	NPN	BC547B, BC107B	BC857B
BC847C	●				1G	1GR	NPN	BC547C	BC857C
BC848A	●				1J	1JR	NPN	BC548A, BC108A	BC858A
BC848B	●				1K	1KR	NPN	BC548B, BC108B	BC858B
BC848C	●				1L	1LR	NPN	BC548C, BC108C	BC858C
BC849B	●				2B	2BR	NPN	BC549B, BC109B	BC859B
BC849C	●				2C	2CR	NPN	BC549C, BC109C	BC859C
BC850B	●				2F	2FR	NPN	BC550B, BCY59	BC860B
BC850C	●				2G	2GR	NPN	BC550C, BCY59	BC860C
BC856A	●				3A	3AR	PNP	BC556A	BC846A
BC856B	●				3B	3BR	PNP	BC556B	BC846B
BC857A	●				3E	3ER	PNP	BC557A, BC177A	BC847A
BC857B	●				3F	3FR	PNP	BC557B, BC177B	BC847B
BC857C	●				3G	3GR	PNP	BC557C	BC847C
BC858A	●				3J	3JR	PNP	BC558A, BC178A	BC848A
BC858B	●				3K	3KR	PNP	BC558B, BC178B	BC848B
BC858C	●				3L	3LR	PNP	BC558C	BC848C
BC859A	●				4A	4AR	PNP	BC559A, BC179A, BCY78	
BC859B	●				4B	4BR	PNP	BC559B, BCY79	BC849B
BC859C	●				4C	4CR	PNP	BC559C, BCY79	BC849C
BC860A	●				4E	4ER	PNP	BC560A, BCY79	
BC860B	●				4F	4FR	PNP	BC560B, BCY79	BC850B
BC860C	●				4G	4GR	PNP	BC560C, BCY79	BC850C
BC868		●			CAC		NPN	BC368, BD329	BC869
BC869		●			CEC		PNP	BC369, BD330	BC868
BCF29	●				C7	C77	PNP	BC559A, BCY78, BC179	
BCF30	●				C8	C9	PNP	BC559B, BCY78	BCF32
BCF32	●				D7	D77	NPN	BC549B, BCY58, BC109	BCF30
BCF33	●				D8	D81	NPN	BC549C, BCY58	
BCF70	●				H7	H71	PNP	BC560B, BCY79	
BCF81	●				K9	K91	NPN	BC550C	
BCV26	●				FD	–	PNP	–	BCV27
BCV27	●				FF	–	NPN	–	BCV26
BCV61		●			D91		NPN	–	BCV62
BCV62		●			C91		PNP	–	BCV61
BCV63			●		D95	–	NPN	–	–
BCV64			●		C95	–	PNP	–	–
BCV65			●		97	–	PNP/NPN	–	–
BCV71	●				K7	K71	NPN	BC546A	
BCV72	●				K8	K81	NPN	BC546B	
BCW29	●				C1	C4	PNP	BC178A, BC558A	BCW31
BCW30	●				C2	C5	PNP	BC178B, BC558B	BCW32
BCW31	●				D1	D4	NPN	BC108A, BC548A	BCW29

Surface–mounting devices: alphanumeric list

For detailed information on these and other types see Data Handbook S7

	case				marking				
type number	SOT–23	SOT–89	SOT–143	SOD–80	type	rev. type	device type	nearest conventional	comple–ment
BCW32	●				D2	D5	NPN	BC108B, BC548B	BCW30
BCW33	●				D3	D6	NPN	BC108C, BC548C	
BCW60A	●				AA		NPN	BC548A	BCW61A
BCW60B	●				AB		NPN	BC548B	BCW61B
BCW60C	●				AC		NPN	BC548B	BCW61C
BCW60D	●				AD		NPN	BC548C	BCW61D
BCW61A	●				BA		PNP	BC558A	BCW60A
BCW61B	●				BB		PNP	BC558B	BCW60B
BCW61C	●				BC		PNP	BC558B	BCW60C
BCW61D	●				BD		PNP	BC558C	BCW60D
BCW69	●				H1	H4	PNP	BC557A	BCW71
BCW70	●				H2	H5	PNP	BC557B	BCW72
BCW71	●				K1	K4	NPN	BC547A	BCW69
BCW72	●				K2	K5	NPN	BC547B	BCW70
BCW81	●				K3	K31	NPN	BC547C	
BCW89	●				H3	H31	PNP	BC556A	
BCX17	●				T1	T4	PNP	BC327	BCX19
BCX18	●				T2	T5	PNP	BC328	BCX20
BCX19	●				U1	U4	NPN	BC337	BCX17
BCX20	●				U2	U5	NPN	BC338	BCX18
BCX51		●			AA		PNP	BC636, BD136	BCX54
BCX52		●			AE		PNP	BC638, BD138	BCX55
BCX53		●			AH		PNP	BC640, BD140	BCX56
BCX54		●			BA		NPN	BC635, BD135	BCX51
BCX55		●			BE		NPN	BC637, BD137	BCX52
BCX56		●			BH		NPN	BC639, BD139	BCX53
BCX70G	●				AG		NPN	BC107A, BC547A	BCX71G
BCX70H	●				AH		NPN	BC107B, BC547B	BCX71H
BCX70J	●				AJ		NPN	BC107B, BC547B	BCX71J
BCX70K	●				AK		NPN	BC107C, BC547C	BCX71K
BCX71G	●				BG		PNP	BC177A, BC557A	BCX70G
BCX71H	●				BH		PNP	BC177B, BC557B	BCX70H
BCX71J	●				BJ		PNP	BC177B, BC557B	BCX70J
BCX71K	●				BK		PNP	BC557C	BCX70K
BF510	●				S6		FET	BF410A	
BF511	●				S7		FET	BF410B	
BF512	●				S8		FET	BF410C	
BF513	●				S9		FET	BF410D	

Surface–mounting devices: alphanumeric list

For detailed information on these and other types see Data Handbook S7

type number	case SOT–23	SOT–89	SOT–143	SOD–80	marking type	rev. type	device type	nearest conventional	comple–ment
BF550	●				G2	G5	PNP	BF450	
BF569	●				G6		PNP	BF970	
BF570	●				B26	–	NPN	BF370	
BF579	●				G7		PNP	BF979	
BF620		●			DC		NPN	BF420, BF471, BF871	BF621
BF621		●			DF		PNP	BF421, BF472, BF872	BF620
BF623		●			DB		PNP	BF423, BF470, BF870	
BF660	●				G8	G81	PNP	BF606A	
BF820	●				1V		NPN	BF420	BF821
BF821	●				1W		PNP	BF421	BF820
BF823	●				1Y		PNP	BF423	
BF824	●				F8		PNP	BF324	
BF840	●				F3		NPN	BF240	
BF841	●				F31		NPN	BF241	
BF989			●		M89		FET	BF960	
BF990A			●				FET	BF980A	
BF991			●		M91		FET	BF981	
BF992			●		M92		FET	BF982	
BF994			●		M94		FET	BF964	
BF994S			●		M93		FET	BF964S	
BF996			●		M96		FET	BF966	
BF996S			●		M95		FET	BF966S	
BF997			●		M83		FET	BF965	
BF998			●				FET	BF988	
BFG17A			●		E6		NPN	BFW92A	
BFG33			●		V6		NPN	BFQ33C	
BFG67			●		V3		NPN	BFG65	
BFG92A			●		P8		NPN	BFG90A	
BFG93A			●		R8		NPN	BFG91A	
BFG197			●		V5		NPN	BFG195	
BFQ17		●			FA		NPN	BFW16A	
BFQ18A		●			FF		NPN	BFQ34	
BFQ19		●			FB		NPN	BFR96	BFQ149
BFQ67		●			V2		NPN	BFQ65	
BFQ149	●				FG		PNP	BFQ32	BFQ19
BFR30	●				M1		FET	BFW11, BF245B	
BFR31	●				M2		FET	BFW12, BF245A	
BFR53	●				N1	N4	NPN	BFW30, BFW93	
BFR92	●				P1	P4	NPN	BFR90	BFT92
BFR92A	●				P2	P5	NPN	BFR90A	BFT92
BFR93	●				R1	R4	NPN	BFR91	BFT93
BFR93A	●				R2	R5	NPN	BFR91A	BFT93
BFR101A			●		M97		FET	–	
BFR101B			●		M98		FET	–	
BFS17	●				E1	E4	NPN	BFY90, BFW92	
BFS17A	●				E2	E5	NPN	BFW92A	
BFS18	●				F1	F4	NPN	BF185, BF495	
BFS19	●				F2	F5	NPN	BF184, BF494	

Surface–mounting devices: alphanumeric list

For detailed information on these and other types see Data Handbook S7

	case				marking				
type number	SOT–23	SOT–89	SOT–143	SOD–80	type	rev. type	device type	nearest conventional	comple–ment
BFS20	●				G1	G4	NPN	BF199	
BFT25	●				V1	V4	NPN	BFT24	
BFT46	●				M3		FET	BFW13, BF245	
BFT92	●				W1	W4	PNP	BFQ51; 52	BFR92
BFT93	●				X1	X4	PNP	BFQ23;24	BFR93
BRY61	●				A5		PNPN	BRY56	
BRY62	●				A51		PNPN	BRY56, BRY39	
BSD20			●		M31		FET	BSD10	
BSD22			●		M32		FET	BSD12	
BSR12	●				B5	B8	PNP	2N2894A	BSV52
BSR13	●				U7	U71	NPN	2N2222, PH2222	BSR15
BSR14	●				U8	U81	NPN	2N2222A, PH2222A	BSR16
BSR15	●				T7	T71	PNP	2N2907, PH2907	BSR13
BSR16	●				T8	T81	PNP	2N2907A, PH2907A	BSR14
BSR17	●				U9	U91	NPN	2N3903	BSR18
BSR17A	●				U92	U93	NPN	2N3904	BSR18A
BSR18	●				T9	T91	PNP	2N3905	BSR17
BSR18A	●				T92	T93	PNP	2N3906	BSR17A
BSR19	●				U35		NPN	2N5550	BSR20
BSR19A	●				U36		NPN	2N5551	BSR20A
BSR20	●				T35		PNP	2N5400	BSR19
BSR20A	●				T36		PNP	2N5401	BSR19A
BSR30		●			BR1		PNP	2N4030	BSR40
BSR31		●			BR2		PNP	2N4031	BSR41
BSR32		●			BR3		PNP	2N4032	BSR42
BSR33		●			BR4		PNP	2N4033	BSR43
BSR40		●			AR1		NPN	BSX46–6	BSR30
BSR41		●			AR2		NPN	BSX46–16	BSR31
BSR42		●			AR3		NPN	2N3020	BSR32
BSR43		●			AR4		NPN	2N3019	BSR33
BSR56	●				M4		FET	2N4856	
BSR57	●				M5		FET	2N4857	
BSR58	●				M6		FET	2N4858	
BSR174	●				LO	–	FET	BSJ174	–
BSR175	●				LP	–	FET	BSJ175	–
BSR176	●				LQ	–	FET	BSJ176	–
BSR177	●				LR	–	FET	BSJ177	–
BSS63	●				T3	T6	PNP	BSS68	BSS64
BSS64	●				U3	U6	NPN	BSS38	BSS63
BSS83			●		M74		FET	BSD213	

Surface–mounting devices: alphanumeric list

For detailed information on these and other types see Data Handbook S7

	case					marking			
type number	SOT–23	SOT–89	SOT–143	SOD–80	SOD–87	type	device type	nearest conventional	comple–ment
BST15		●				BT1	PNP	2N5415	BST40
BST16		●				BT2	PNP	2N5416	BST39
BST50		●				AS1	NPN	BSR50, BSS50, BDX42	
BST51		●				AS2	NPN	BSR51, BSS51, BDX43	
BST52		●				AS3	NPN	BSR52, BSS52, BDX44	
BST60		●				BS1	PNP	BSR60, BSS60, BDX45	
BST61		●				BS2	PNP	BSR61, BSS61, BDX46	
BST62		●				BS3	PNP	BSR62, BSS62, BDX47	
BST80		●				KM	FET	BST70A	
BST82	●					OZ	FET	BST72A	
BST84		●				KN	FET	BST74A	
BST86		●				KQ	FET	BST76A	
BST120		●				LM	FET	BST100	
BST122		●				LN	FET	BST110, BS250	
BSV52	●					B2*	NPN	PH2369, BSX20	BSR12
BYD17					●		diode		
BYD77					●		diode		
BYD37					●		diode		
BZD27					●		diode		
BZV49		●				*	diode	BZV85	
BZV55				●			diode		
BZX84	●					*	diode	BZX79	
PBMF4391	●					M62	FET	2N4391, PH4391	
PBMF4392	●					M63	FET	2N4392, PH4392	
PBMF4393	●					M64	FET	2N4395, PH4395	
PBMT2222	●					P1B	NPN	2N2222	PMBT2907
PBMT2222A	●					P1P	NPN	2N2222A	..2907A
PBMT2907	●					P2B	PNP	2N2907	PMBT2222
PBMT2907A	●					P2F	PNP	2N2907A	..2222A
PMBT3903	●					P1Y	NPN	2N3903	PMBT3905
PMBT3904	●					P1A	NPN	2N3904	PMBT3905
PMBT3906	●					P2A	PNP	2N3906	PMBT3904
PMBT6428	●					P1K	NPN	2N6428	
PMBT6429	●					P1L	NPN	2N6429	
PMBTA05	●					P1H	NPN	MPSA05	PMBTA55
PMBTA06	●					P1G	NPN	MPSA06	PMBTA56
PMBTA13	●					P1M	NPN	MPSA13	PMBTA63
PMBTA14	●					P1N	NPN	MPSA14	PMBTA64
PMBTA42	●					P1D	NPN	MPSA42	PMBTA94

* Reverse type: B3

Surface–mounting devices: alphanumeric list

For detailed information on these and other types see Data Handbook S7

type number	case					marking	device type	nearest conventional	comple–ment
	SOT–23	SOT–89	SOT–143	SOD–80	SOD–87	type			
PMBTA43	●					P1E	NPN	MPSA43	PMBTA93
PMBTA55	●					P2G	NPN	MPSA55	PMBTA05
PMBTA56	●					P2H	NPN	MPSA56	PMBTA06
PMBTA63	●					P2U	PNP	MPSA63	PMBTA13
PMBTA64	●					P2V	PNP	MPSA64	PMBTA14
PMBTA92	●					P2D	PNP	MPSA92	PMBTA42
PMBTA93	●					P2E	PNP	MPSA93	PMBTA43
PMLL5225B								1N5225B	
to								to	
PMLL5267B				●			diode	1N5267B	
PXT3904	●					P1A	NPN	2N3904	PXT3906
PXT3906	●					P2A	PNP	2N3906	PXT3904

Surface–mounting devices: alphanumeric list

For detailed information on these and other types see Data Handbook S7

type case device type nearest conventional type	BZV49 SOT–89 diode BZV85 series	BZX84 SOT–23 diode BZX79 series
type number suffix	mark	mark
C2V4	2Y4	Z11
C2V7	2Y7	Z12
C3V0	3Y0	Z13
C3V3	3Y3	Z14
C3V6	3Y6	Z15
C3V9	3Y9	Z16
C4V3	4Y3	Z17
C4V7	4Y7	Z1
C5V1	5Y1	Z2
C5V6	5Y6	Z3
C6V2	6Y2	Z4
C6V8	6Y8	Z5
C7V5	7Y5	Z6
C8V2	8Y2	Z7
C9V1	9Y1	Z8
C10	10Y	Z9
C11	11Y	Y1
C12	12Y	Y2
C13	13Y	Y3
C15	15Y	Y4
C16	16Y	Y5
C18	18Y	Y6
C20	20Y	Y7
C22	22Y	Y8
C24	24Y	Y9
C27	27Y	Y10
C30	30Y	Y11
C33	33Y	Y12
C36	36Y	Y13
C39	39Y	Y14
C43	43Y	Y15
C47	47Y	Y16
C51	51Y	Y17
C56	56Y	Y18
C62	62Y	Y19
C68	68Y	Y20
C75	75Y	Y21

For detailed information on these and other types see Data Handbook S8b

Currently available technologies:

- **Metallo–Organic Vapour Phase Epitaxy** (MOVPE); process in ternary (GaAlAs) and quaternary (InGaAsP/InP) compounds, combined with:
  - PB (Proton Bombarded) compounds) laser structure
    - gain guided, multi–longitudinal structure
    - extremely low sensitivity to optical feedback
    - choice of wavelengths (820 nm, 850 nm, 870 nm)
  - DCPBH (Double Channel Planar Buried Hetero) laser structure
    - high reliability, long life expectancy
    - stable operation over a wide temperature range
    - low sensitivity to optical feedback
    - designed for the 1.3 µm and 1.55 µm communications windows
  - ICC (Internal Current Confinement) quatenary surface emitting LED structure
    - high quantum efficiency
    - high reliability
    - good linearity
- **Liquid Phase Epitaxy** (LPE) process, mastered for high volume, low cost and reliability, combined with:
  - BTRS (Buried Twin Ridge Substrate) laser structure
    - index–guided
    - tailored to low cost mass production
    - life expectancy > 100 000 hours

Laser Diodes

- low/medium/high–powered gain guided semiconductor lasers
- low–cost, LPE index–guided lasers with BTRS

type	techn.	wave–length λ nm	optical power P_o mW	threshold current I_{th} mA	operating current I_{op} mA	operating voltage V_{op} V
CQL20	LPE	790	3	40	57	1.8
CQL21	LPE	790	3	40	50	1.8
CQL60A*	MOVPE	820	5	70	90	2.0
CQL63A*	MOVPE	820	5	70	90	2.0
CQL61A*	MOVPE	820	20	90	115	2.2
CQL62A*	MOVPE	820	40	100	140	2.2

All values typical at T = 25 °C

* Typical peak wavelengths of 850 and 875 nm are available

Laser diodes (cont.)

For detailed information on these and other types see Data Handbook S8b

Table continued from previous page

radiation angles		emission point accuracy					
parallel to junc. $\Theta_{\parallel}$ deg	perpen. to junc. $\Theta_{\perp}$ deg	angles $\Delta\phi_{\parallel}\Delta\phi_{\perp}$ deg	positio–nal hor/vert µm	differential efficiency mW/mA	polarity laser pin	type	techn.
12	35	2/3	50/30	0.35	positive	**CQL20**	LPE
12	35	2/3	50/30	0.35	positive	**CQL21**	LPE
35	40	2/3	50/30	0.40	negative	**CQL60A***	MOVPE
35	40	2/3	50/30	0.40	negative	**CQL63A***	MOVPE
21	27	2/3	50/30	0.70	negative	**CQL61A***	MOVPE
7	23	2/3	50/30	1.10	negative	**CQL62A***	MOVPE

All values typical at T = 25 °C

* Typical peak wavelengths of 850 and 875 nm are available

General data
Collimator Pens

For detailed information on these and other types see Data Handbook S8b

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The Philips range of collimated laser sources offers a host of unique features:

- a collimated laser beam with an optical power up to 20 mW
- a small (17 mm), rugged, low cost alternative to glass–tube lasers
- the high reliability of semiconductor lasers – life expectancy > 100 000 hours
- low power consumption –200 –500 mW for MOVPE lasers, 100 mW for BTRS lasers

Collimated laser applications include:

- barcode scanners
- target markers/range finders
- distance measuring equipment
- Digital Optical Recording (DOR)
- non–impact printers

type	techn.	wave–length λ nm	optical power P_o mW	threshold current I_{th} mA	operating current I_{op} mA	operating voltage V_{op} V	beam collimat. $\lvert col \rvert$ deg	deviation optic./mech axes max. mrad
CQL30	LPE	790	2	40	60	1.8	0.3	10
CQL73	LPE	790	1	40	50	1.8	0.6	13
CQL70A*	MOVPE	820	2	70	90	2.0	0.3	10
CQL75	MOVPE	820	2	70	90	2.0	0.3	13
OF945**	MOVPE	820	3	70	90	2.0	0.2	10
OF945***	MOVPE	820	20	70	150	4.0	0.35	10
CQL71A*	MOVPE	820	10	90	115	2.2	0.30	10
CQL72A*	MOVPE	820	20	105	135	2.2	0.30	10

All values typical at T = 25°C, unless otherwise stated

* Typical peak wavelengths of 850 and 870 nm are available

** continuous wave

*** pulsed

PHILIPS

Collimator Pens (cont.)

For detailed information on these and other types see Data Handbook S8b

Table continued from previous page

polarity laser pin	dimensions diameter ∅ mm	dimensions length l mm	weight g	type	tech.
negative	11	27	13	**CQL30**	MOVPE
positive	8	17	4	**CQL73**	MOVPE
negative	11	27	13	**CQL70A***	MOVPE
negative	8	17	4	**CQL75**	MOVPE
negative	11	27	13	**OF945****	MOVPE
negative	11	27	13	**OF945*****	MOVPE
negative	11	27	13	**CQL71A***	MOVPE
negative	11	27	13	**CQL72A***	MOVPE

All values typical at T = 25°C, unless otherwise stated
* Typical peak wavelengths of 850 and 870 nm are available
** continuous wave
*** pulsed

Laser diodes for fibre–optic communication

For detailed information on these and other types see Data Handbook S8b

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Features:

- choice of wavelengths suitable to all three fibre–optic communication windows
- DCPBH structure for high reliability, good quality and low optical feedback sensitivity
- coaxial encapsulation for high coupling efficiency
- DIL–14 TE–cooled housing coupled to SM or MM fibre
- low inductance DIL–14 packagedesigned for operation up to 4 Gbits/s
- connectable laser receptacle produced in accordance with FC, SMA or DIN standards
- manufactured under tight process control and with high–stress burn–in

type	struct–ure	wave–length λ_p nm	optical power P_o mW	operating current I_{op} mA	operating voltage V_{op} V	differential efficiency mW/mA	encapsulation	fibre specification
CQF50	DCPBH	1300	2	35	1.5	0.1	1	MM
CQF51	DCPBH	1300	1.5	35	1.5	0.1	1	SM
CQF52	DCPBH	1300	0.3	30	1.5	0.02	1	SM
CQF53	DCPBH	1550	0.75	40	1.5	0.03	1	SM
CQF55	DCPBH	1300	2	50	1.5	0.1	2	MM
CQF56	DCPBH	1300	1.5	50	1.5	0.05	2	SM
CQF58	DCPBH	1550	1.75	60	1.5	0.01	2	SM
CQF60*	DCPBH	1300	1	50	1.5	0.1	2	SM
CQF61	DCPBH/DFB	1550	0.75	50	1.5	0.03	2	SM

type	beam guidance	laser diameter ∅ mm	wavelength λ_p nm	optical power P_o mW	operating current I_{op} mA	operting voltage V_{op} V
CQF22/D31	index	9	790	2	50	1.8
CQF23/D21	index	5.6	790	2	50	1.8
CQF25A/D21	gain	5.6	820	2	100	2.0
CQF26H/D27	index	5.6	1300	0.2	50	1.5
CQF27A/D21	gain	9	820	2	100	2.0

1: Flanged coaxial, non–TE cooled
2: Dil–14 TE cooled
* Designed for high–bit rate operation up to 4 Gbits/s
** optional mountings: bulkhead; 4–hole flange; PC–board block

Laser diodes for fibre–optic communication (cont.)

For detailed information on these and other types see Data Handbook S8b

Table continued from previous page

differential efficiency	encapsulation			
	receptacle mounting	connectors		
mW/mA	**	standard	optional	type
0.2	4–hole flange	FC	SMA/DIN/ST	**CQF22/D31**
0.2	2–hole flange	FC	SMA/DIN/ST	**CQF23/D21**
0.2	2–hole flange	FC	SMA/DIN/ST	**CQF25A/D21**
0.01	2–hole flange	FC/SM	FC/PC	**CQF26H/D27**
0.2	2–hole flange	FC	SMA/DIN/ST	**CQF27A/D21**

** optional mountings: bulkhead; 4–hole flange; PC–board block

Laser diodes for fibre–optic communication (cont.)

For detailed information on these and other types see Data Handbook S8b

Features:
- GaAlAs ternary compound in SHJ and DHJ structure
- ICC (Internal Current Confinement) structure for 1.3 µm LED based on InGaAsP compounds
- high reliability
- TO–46 double lens, precision TO–46 microlens and TO–46 flat window encapsulation
- matching emitter/receiver components

type	wave–length λ nm	coupled optical power P_{out} at µW	I_f mA	bandwidth MHz	recommended fibre diameter µm	encapsulation
CQF24	850	20	100	40	200 core	TO–46 double lens
CQF40	850	20	100	50	100/140	TO–46 double lens
CQF41	850	30	100	50	100/140	TO–46 double lens
CQF42	850	20	100	60	50/125	TO–46 flat window
CQF45	1300	15	100	150	50/125	TO–46 microlens
CQF46	1300	25	100	50	50/125	TO–46 microlens
CQF47	1550	10	100	150	50/125	TO–46 flat window
CQF48	1550	20	100	50	50/125	TO–46 flat window

PIN–receiver diodes for fibre optic communication

type	sensitivity A/W	wavelength nm	dark current nA	encapsulation
BFP24	0.4	850	0.8	TO–46 double lens
BFP31	0.55	850	5.0	TO–46 flat window

Infrared receivers

For detailed information on these and other types see Data Handbook S8b
For smallest packing quantity (SPQ) see table, below

Photo transistors

type	status	λp nm	$\Delta\lambda$ nm	$\theta_{1/2}$ deg.	V_R or V_{CE} max V*	I_R or I_C max mA*	P_{tot} max mW	I_R I_C at E_e and V_R			SPQ	case
								mA	mW/cm^2	V		
BPW22A–1	P	800	400	20	50	25	100	1.5–8	1.0	5	1000	SOD–53F
BPW22A–2	C	800	400	20	50	25	100	5–25	1.0	5	1000	SOD–53F

Photo diode

type	status	λp nm	$\Delta\lambda$ nm	$\theta_{1/2}$ deg.	V_R or V_{CE} max V*	I_R or I_C max mA*	P_{tot} max mW	I_R I_C at E_e and V_R			SPQ	case
								mA	mW/cm^2	V		
BPW50	P	930	–	–	32	–	150	0.045	1.0	5	1000	SOD–67

* V_R & I_R with diodes, V_{CE} & I_C with transistors.

Infrared GaAs and GaAlAs LEDs

For detailed information on these and other types see Data Handbook S8b

Round, 3 mm diameter

package	type	λ_p typ. nm	I_F max. mA	I_{FRM} max. mA	V_R max. V	Φ_e and typ. µW	I_e at mW/sr	I_F mA	$\theta_{1/2}$ typ. deg	t_r typ. ns	t_f typ. ns	crystal
SOD53F	**CQW58A–1**	830	60	1000*	5	1000	1 to 5	20	15	30	30	GaAlAs
	CQW58A–2	830	60	1000*	5	1000	>3	20	15	30	30	GaAlAs
	CQY58A	930	50	200*	5	1000	>2	20	20	3000	3000	GaAs
	CQY58A–1	930	50	200*	5	1000	1 to 5	20	20	3000	3000	GaAs
	CQY58A–2	930	50	200*	5	1000	>2	20	20	3000	3000	GaAs

Round, 5 mm diameter

package	type	λ_p typ. nm	I_F max. mA	I_{FRM} max. mA	V_R max. V	Φ_e and typ. µW	I_e at mW/sr	I_F mA	$\theta_{1/2}$ typ. deg	t_r typ. ns	t_f typ. ns	crystal
SOD63D2	**CQW89A**	830	130	2500*	5	8000	> 9	100	24	30	30	GaAlAs
	CQW89A–1	830	130	2500*	5	8000	> 12	100	24	30	30	GaAlAs
	CQW89A–2	830	130	2500*	5	8000	> 15	100	24	30	30	GaAlAs
SOD94	**CQW89B**	830	130	2500*	5	8000	> 20	100	12	30	30	GaAlAs
SOD63B2	**CQY89A**	930	130	1000**	5	10000	> 9	100	40	1000	1000	GaAs
	CQY89A–1	930	130	1000**	5	10000	> 12	100	40	1000	1000	GaAs
	CQY89A–2	930	130	1000**	5	10000	> 15	100	40	1000	1000	GaAs
FO–192	**CQY90A**	930	100	1000	5	21000	> 15	100	60	1000	1000	GaAs

Rectangular with round end

package	type	λ_p typ. nm	I_F max. mA	I_{FRM} max. mA	V_R max. V	Φ_e and typ. µW	I_e at mW/sr	I_F mA	$\theta_{1/2}$ typ. deg	t_r typ. ns	t_f typ. ns	crystal
SOD93	**CQY89F**	930	130	1000**	5	10000	> 9	100	30***	1000	1000	GaAs
	CQY89F–1	930	130	1000**	5	10000	> 12	100	30***	1000	1000	GaAs
	CQY89F–2	930	130	1000**	5	10000	> 15	100	30***	1000	1000	GaAs

* pulse width $\leqslant 10$ µs; $\delta = 0.01$

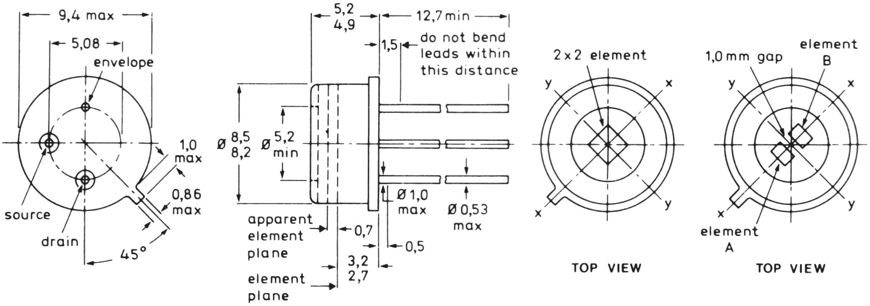
** pulse width $\leqslant 50$ µs; $\delta = 0.05$

*** beamwith = 30° in the plane of the leads and 25° perpendicular to that plane

Pyroelectric infrared detectors

For detailed information on these and other types see Data Handbook S8b

SOT–49H


9,4 max
5,08
envelope
1,0 max
0,86 max
source
drain
45°
5,2
4,9
12,7 min
1,5
do not bend leads within this distance
Ø 8,5 8,2
Ø 5,2 min
Ø 1,0 max
Ø 0,53 max
apparent element plane
0,7
0,5
3,2 2,7
element plane
2 x 2 element
y
x
x
y
TOP VIEW
1,0 mm gap
element B
y
x
x
y
element A
TOP VIEW

The ceramic pyroelectric detector consists of an infrared sensitive element, a low–noise impedance–matching network, and an infrared window, all in a TO–5 encapsulation. The devices are rugged, low–cost components ideally suited for use in intruder detection systems, infrared radiometry and similar applications.

type	number of elements	element dimension mm	spectral response µm	responsivity typ V/W	N.E.P typ W/Hz½	case
RPY100	1	2 x 1	6 to 15	(10 µm, 10) 150	(10 µm, 10.1) 2.5 x 10^{-9}	SOT–49H
RPY101	1	2 x 1.5	6 to 15	(10 µm, 10) 150	(10 µm, 10.1) 3.8 x 10^{-9}	SOT–49H
RPY102	1	2 x 2	6 to 15	(10 µm, 10) 75	(10 µm, 10.1) 5 x 10^{-9}	SOT–49H
RPY103	2	2 x 1	6 to 15	(10 µm, 10) 150	(10 µm, 10.1) 2.2 x 10^{-9}	SOT–49H
RPY109	1	2 x 2	1 to 15	(500 K, 10) 65	(500 K, 10.1) 6 x 10^{-9}	SOT–49H
P2105	1	2 x 2	1 to 25	(500 K, 10) 90	(500 K, 10,1) 1,4 x 10^{-9}	SOT–49G

Light–emitting diodes

For detailed information on these and other types see Data Handbook S8a
Smallest packing quantity: ∅5 = 1000.

Status:
P – all non–classified and middle classes
C – all other classes

case	type	crystal	light colour	λ_p nm	$\theta_{1/2}$ deg	V_F I_F = 10 mA V	at I_F max mA	package colour diffusor	existing classes in mcd at I_F
SOD53E	**PLED–H313A–6**	GaAlAs	hyper–red		60	2.2	10	red–clear	6
SOD53E	**PLED–H313A–4**	GaAlAs	hyper–red		60	2.2	10	red–clear	4
SOD53E	**PLED–H313A–7**	GaAlAs	hyper–red		60	2.2	10	red–clear	7
SOD53E	**PLED–H313A–5**	GaAlAs	hyper–red		60	2.2	10	red–clear	5
SOD53E	**PLED–H314A–3**	GaAlAs	hyper–red		100	2.2	10	red–diffused	3
SOD53E	**CQW58A**	GaAlAs	infrared		15	1.5	20	red–diffused	
SOD53E	**PLED–H314A–4**	GaAlAs	hyper–red		100	2.2	10	red–diffused	4
SOD53E	**PLED–H313A**	GaAlAs	hyper–red		60	2.2	10	red–clear	
SOD53E	**PLED–H314A–5**	GaAlAs	hyper–red		100	2.2	10	red–diffused	5
SOD53E	**PLED–H314A**	GaAlAs	hyper–red		100	2.2	10	red–diffused	
SOD53E	**PLED–H314A–6**	GaAlAs	hyper–red		100	2.2	10	red–diffused	6
SOD53E	**PLED–H313A–C**	GaAlAs	hyper–red		60	2.2	2	red–clear	
SOD53E	**PLED–H314A–B**	GaAlAs	hyper–red		100	2.2	2	red–diffused	
SOD53E	**PLED–H314A–C**	GaAlAs	hyper–red		100	2.2	2	red–diffused	
SOD82C	**PLED–G313N–5**	GaP	super–green		25	2.8	20	green–clear	5
SOD82C	**PLED–O313N–5**	GaAsP	orange		40	2.8	20	red–clear	5
SOD82C	**PLED–G313N–6**	GaP	super–green		25	2.8	20	green–clear	6
SOD82C	**PLED–O313N–6**	GaAsP	orange		40	2.8	20	red–clear	6
SOD82C	**PLED–G314N–4**	GaP	super–green		60	2.8	20	green–diffused	4
SOD82C	**PLED–O314N–4**	GaAsP	orange		70	2.8	20	red–diffused	4
SOD82C	**PLED–G314N–5**	GaP	super–green		60	2.8	20	green–diffused	5
SOD82C	**PLED–O314N–5**	GaAsP	orange		70	2.8	20	red–diffused	5
SOD82C	**PLED–P313N–3**	GaP(ZnO)	ultra–red		25	2.8	20	red–clear	3
SOD82C	**PLED–P313N–4**	GaP(ZnO)	ultra–red		25	2.8	20	red–clear	4
SOD82C	**PLED–P314N–2**	GaP(ZnO)	ultra–red		60	2.8	20	red–diffused	2
SOD82C	**PLED–P314N–3**	GaP(ZnO)	ultra–red		60	2.8	20	red–diffused	3
SOD82C	**PLED–Y313N–3**	GaAsP	yellow		25	2.8	20	yellow–clear	3
SOD82C	**PLED–Y313N–4**	GaAsP	yellow		25	2.8	20	yellow–clear	4
SOD82C	**PLED–Y314N–3**	GaAsP	yellow		60	2.8	20	yellow–diffused	3
SOD82C	**PLED–Y314N–4**	GaAsP	yellow		60	2.8	20	yellow–diffused	4
SOD82C	**PLED–G313N**	GaP	super–green		25	2.8	20	green–diffused	
SOD82C	**PLED–G314N**	GaP	super–green		60	2.8	20	green–diffused	
SOD82C	**PLED–0313N**		orange		40	2.8	20	red–clear	
SOD82C	**PLED–0314N**		orange		70	2.8	20	red–diffused	
SOD82C	**PLED–P313N**	GaP(ZnO)	ultra–red		25	2.8	20	red–clear	
SOD82C	**PLED–P314N**	GaP(ZnO)	ultra–red		60	2.8	20	red–diffused	
SOD82C	**PLED–Y313N**	GaAsP	yellow		25	2.8	20	yellow–clear	
SOD82C	**PLED–Y314N**	GaAsP	yellow		60	2.8	20	yellow–diffused	

Light–emitting diodes (cont.)

For detailed information on these and other types see Data Handbook S8a
Smallest packing quantity: ∅5 = 1000.

Status:
P – all non–classified and middle classes
C – all other classes

case	type	crystal	light colour	λ_p nm	$\theta_{1/2}$ deg	V_F I_F = 10 mA V	at I_F max mA	package colour diffusor	existing classes in mcd at I_F
SOD63A	**PLED–H514B–3**	GaAlAs	hyper–red		100	2.2	10	red–diffused	3
SOD63A	**PLED–H514B–4**	GaAlAs	hyper–red		100	2.2	10	red–diffused	4
SOD63A	**PLED–H514B–5**	GaAlAs	hyper–red		100	2.2	10	red–diffused	5
SOD63A	**PLED–H514B–6**	GaAlAs	hyper–red		100	2.2	10	red–diffused	6
SOD63A	**PLED–T512B–4X**	GaAlAs	hyper–red		70	2.2	10	colourless–diff	4
SOD63A	**PLED–H514B–B**	GaAlAs	hyper–red		100	2.2	2	red–diffused	
SOD63A	**CQW89B**	GaAlAs	infrared		12	1.7	100	blue–diffused	
SOD63A	**PLED–H514B**	GaAlAs	hyper–red		100	2.2	10	red–diffused	
SOD63A	**PLED–T512B**	GaAlAs	hyper–red		70	2.2	10	colourless–diff	
SOD63A	**PLED–H514B–C**	GaAlAs	hyper–red		100	2.2	2	red–diffused	
SOD63D	**PLED–H511C**	GaAlAs	hyper–red		20	2.2	10	clear	
SOD63D	**PLED–H511C–7**	GaAlAs	hyper–red		20	2.2	10	clear	7
SOD63D	**PLED–H511C–8**	GaAlAs	hyper–red		20	2.2	10	clear	8
SOD63D	**PLED–H511C–9**	GaAlAs	hyper–red		20	2.2	10	clear	9
SOD63D	**PLED–H511C–10**	GaAlAs	hyper–red		20	2.2	10	clear	10
SOD63D	**PLED–H511C–F**	GaAlAs	hyper–red		20	2.2	2	clear	
SOD63D	**PLED–H511C–G**	GaAlAs	hyper–red		20	2.2	2	clear	
SOD85AL	**PLED–H544KL–3**	GaAlAs	hyper–red		70	2.2	10	red–diffused	3
SOD85AL	**PLED–H544KL–4**	GaAlAs	hyper–red		70	2.2	10	red–diffused	4
SOD85AL	**PLED–H544KL–5**	GaAlAs	hyper–red		70	2.2	10	red–diffused	5
SOD85AL	**PLED–H544KL–6**	GaAlAs	hyper–red		70	2.2	10	red–diffused	6
SOD85AL	**PLED–H544KL**	GaAlAs	hyper–red		70	2.2	10	red–diffused	
SOD85BL	**PLED–H544LL**	GaAlAs	hyper–red		70	2.2	20	red–diffused	
SOD85BL	**PLED–H544LL–3**	GaAlAs	hyper–red		70	2.2	20	red–diffused	3
SOD85BL	**PLED–H544LL–4**	GaAlAs	hyper–red		70	2.2	20	red–diffused	4
SOD85BL	**PLED–H544LL–5**	GaAlAs	hyper–red		70	2.2	20	red–diffused	5
SOD85BL	**PLED–H544LL–6**	GaAlAs	hyper–red		70	2.2	20	red–diffused	6

For detailed information on these and other types see Data Handbook S8a
Smallest packing quantity: ∅3 = 1000

Status:
P – all non–classified and middle classes
C – all other classes

case	type	crystal	light colour	λ_p nm	$\theta_{1/2}$ deg	V_F I_F = 10 mA V	at I_F max mA	package colour diffusor	existing classes in mcd at I_F
SOD53E	**PLED–H313A–C**	GaAlAs	hyper–red		60	2.2	2	red–clear	
SOD53E	**PLED–H314A–B**	GaAlAs	hyper–red		100	2.2	2	red–diffused	
SOD53E	**PLED–H314A–C**	GaAlAs	hyper–red		100	2.2	2	red–diffused	
SOD53E	**PLED–H313A**	GaAlAs	hyper–red		60	2.2	10	red–clear	
SOD53E	**PLED–H314A**	GaAlAs	hyper–red		100	2.2	10	red–diffused	
SOD53E	**PLED–H313A–4**	GaAlAs	hyper–red		60	2.2	10	red–clear	4
SOD53E	**PLED–H313A–5**	GaAlAs	hyper–red		60	2.2	10	red–clear	5
SOD53E	**PLED–H313A–6**	GaAlAs	hyper–red		60	2.2	10	red–clear	6
SOD53E	**PLED–H313A–7**	GaAlAs	hyper–red		60	2.2	10	red–clear	7
SOD53E	**PLED–H314A–3**	GaAlAs	hyper–red		100	2.2	10	red–diffused	3
SOD53E	**PLED–H314A–4**	GaAlAs	hyper–red		100	2.2	10	red–diffused	4
SOD53E	**PLED–H314A–5**	GaAlAs	hyper–red		100	2.2	10	red–diffused	5
SOD53E	**PLED–H314A–6**	GaAlAs	hyper–red		100	2.2	10	red–diffused	6
SOD63A	**PLED–H514B–3**	GaAlAs	hyper–red		100	2.2	10	red–diffused	3
SOD63A	**PLED–H514B–4**	GaAlAs	hyper–red		100	2.2	10	red–diffused	4
SOD63A	**PLED–H514B–5**	GaAlAs	hyper–red		100	2.2	10	red–diffused	5
SOD63A	**PLED–H514B–6**	GaAlAs	hyper–red		100	2.2	10	red–diffused	6
SOD63A	**PLED–H514B–B**	GaAlAs	hyper–red		100	2.2	2	red–diffused	
SOD63A	**PLED–H514B**	GaAlAs	hyper–red		100	2.2	10	red–diffused	
SOD63A	**PLED–H514B–C**	GaAlAs	hyper–red		100	2.2	2	red–diffused	
SOD63D	**PLED–H511C**	GaAlAs	hyper–red		20	2.2	10	clear	
SOD63D	**PLED–H511C–7**	GaAlAs	hyper–red		20	2.2	10	clear	7
SOD63D	**PLED–H511C–8**	GaAlAs	hyper–red		20	2.2	10	clear	8
SOD63D	**PLED–H511C–9**	GaAlAs	hyper–red		20	2.2	10	clear	9
SOD63D	**PLED–H511C–10**	GaAlAs	hyper–red		20	2.2	10	clear	10
SOD63D	**PLED–H511C–F**	GaAlAs	hyper–red		20	2.2	2	clear	
SOD63D	**PLED–H511C–G**	GaAlAs	hyper–red		20	2.2	2	clear	

Light–emitting diodes (cont.)

For detailed information on these and other types see Data Handbook S8a
Smallest packing quantity: ∅5 = 1000

Status:
P = all non–classified and middle classes
C = all other classes

case	type	crystal	light colour	λ_p nm	$\theta_{1/2}$ deg	V_F I_F = 10 mA V	at I_F max mA	package colour diffusor	existing classes in mcd at I_F
	PLED–GR14R	GaP	super–green		110	2.8	10	green–diffused	
	PLED–OR14R		orange		120	2.8	10		
	PLED–PR14R		ultra–red		110	2.8			
	PLED–YR14R		yellow		110	2.8	10		
	PLED–GR14P		super–green		180	2.8			
	PLED–OR14P		orange		180	2.8			
	PLED–PR14P		ultra–red		180	2.8			
	PLED–YR14P		yellow		180	2.8			
	PLED–GR14T		super–green		130	2.8	10		
	PLED–OR14T		yellow		130	2.8	10	red–diffused	
	PLED–PR14T		ultra–red		130	2.8		red–diffused	
	PLED–YR14T		yellow		115	2.8	10	yellow–diffused	
	PLED–GR14R–1	GaP	super–green		110	2.8	10	green–diffused	1
	PLED–GR14R–2	GaP	super–green		110	2.8	10	green–diffused	2
	PLED–OR14R–1		orange		120	2.8	10	red–diffused	1
	PLED–OR14R–2		orange		120	2.8	10	red–diffused	2
	PLED–YR14R–1		yellow		110	2.8	10	yellow–diffused	1
	PLED–YR14R–2		yellow		110	2.8	10	yellow–diffused	2
	PLED–GR14T–1		super–green		130	2.8	10	green–diffused	1
	PLED–GR14T–2		super–green		130	2.8	10	green–diffused	2
	PLED–OR14T–1		orange		130	2.8	10	red–diffused	1
	PLED–OR14T–2		orange		130	2.8	10	red–diffused	2
	PLED–YR14T–1		yellow		115	2.8	10	yellow–diffused	1
	PLED–YR14T–2		yellow		115	2.8	10	yellow–diffused	2

For detailed information on these and other types see Data Handbook S8a
Smallest packing quantity: ∅5 = 1000

Status:
P = all non–classified and middle classes
C = all other classes

case	type	crystal	light colour	λ_p nm	$\theta_{1/2}$ deg	V_F I_F = 10 mA V	at I_F max mA	package colour diffusor	existing classes in mcd at I_F
SOD74L	**PLED–HR44DL**	GaAlAs	hyper–red		100	2.8	10	red–diffused	
SOD74L	**PLED–TR42DL**	GaAlAs	hyper–red		110	2.2	10	colourless–diff	
SOD74L	**PLED–HR44DL–1**	GaAlAs	hyper–red		100	2.2	10	red–diffused	1
SOD74L	**PLED–HR44DL–3**	GaAlAs	hyper–red		100	2.2	10	red–diffused	3
SOD74L	**PLED–HR44DL–4**	GaAlAs	hyper–red		100	2.2	10	red–diffused	4
SOD74L	**PLED–TR42DL–2X**	GaAlAs	hyper–red		110	2.2	10	colourless–diff	2
SOD75B	**PLED–HR14E–1**	GaAlAs	hyper–red		110	2.2	10	red–diffused	1
SOD75B	**PLED–HR14E–3**	GaAlAs	hyper–red		110	2.2	10	red–diffused	3
SOD75B	**PLED–HR14E–4**	GaAlAs	hyper–red		110	2.2	10	red–diffused	4
SOD75B	**PLED–HR14E**	GaAlAs	hyper–red		110	2.2	10	red–diffused	
SOD75B	**PLED–TR12E**	GaAlAs	hyper–red		110	2.2	10	colourless–diff	
SOD75B	**PLED–TR12E–2X**	GaAlAs	hyper–red		110	2.2	10	colourless–diff	2
SOD76A	**PLED–HR14F–1**	GaAlAs	hyper–red		100	2.2	10	red–diffused	1
SOD76A	**PLED–HR14F–3**	GaAlAs	hyper–red		100	2.2	10	red–diffused	3
SOD76A	**PLED–HR14F–4**	GaAlAs	hyper–red		100	2.2	10	red–diffused	4
SOD76A	**PLED–TR12F–2X**	GaAlAs	hyper–red		110	2.2	10	colourless–diff	2
SOD76A	**CQY89F**		infrared					red–diffused	
SOD76A	**PLED–HR14F**	GaAlAs	hyper–red		100	2.2	10	red–diffused	
SOD76A	**PLED–TR12F**	GaAlAs	hyper–red		110	2.2	10	colourless–diff	
SOD77A	**PLED–HR14G**	GaAlAs	hyper–red		100	2.2	10	red–diffused	
SOD77A	**PLED–TR12G**	GaAlAs	hyper–red		110	2.2	10	colourless–diff	
SOD77A	**PLED–HR14G–1**	GaAlAs	hyper–red		100	2.2	10	red–diffused	1
SOD77A	**PLED–HR14G–3**	GaAlAs	hyper–red		100	2.2	10	red–diffused	3
SOD77A	**PLED–HR14G–4**	GaAlAs	hyper–red		100	2.2	10	red–diffused	4
SOD77A	**PLED–TR12G–2X**	GaAlAs	hyper–red		110	2.2	10	colourless–diff	2

For detailed information on these and other types see Data Handbook S8b
Standard types, UL recognised and VDE approved

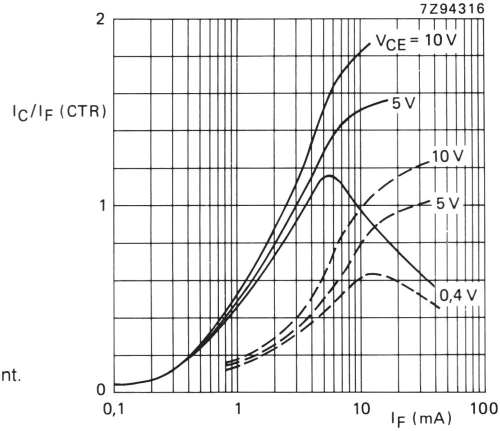


Fig.1 Current transfer ratio versus forward current.
Piece with a high I_C/I_F (CTR).
Piece with a low I_C/I_F (CTR).

type	case	C.T.R. I_F = 10 mA V_{CE} = 0.4 V min	C.T.R. I_F = 10 mA V_{CE} = 0.4 V max	$V_{(BR)CEO}$ min V	V_{IORM} peak kV (AC)	t_{on} typ I_C = 2 mA V_{CC} = 5 V R_L = 100 Ω µs	t_{off} typ I_C = 2 mA V_{CC} = 5 V R_L = 100 Ω µs	status
CNX39U	**SOT–90B**	0.6	1	30	4.4	5.5	4	P
CNX35U	**SOT–90B**	0.4	1.6	30	4.4	3	3	P
CNX36U	**SOT–90B**	0.8	2	30	4.4	8	6	P
CNY57AU	**SOT–90B**	0.4		30	4.4	5*	5*	P
CNY57U	**SOT–90B**	0.2	0.8	30	4.4	3	3	P

* I_C = 4 mA

High voltage transistor output

type	case	C.T.R. I_F = 10 mA V_{CE} = 0.4 V min	C.T.R. I_F = 10 mA V_{CE} = 0.4 V max	$V_{(BR)CEO}$ min V	V_{IORM} peak kV (AC)	t_{on} typ I_C = 4 mA V_{CC} = 5 V R_L = 100 Ω µs	t_{off} typ I_C = 4 mA V_{CC} = 5 V R_L = 100 Ω µs	status
CNX38U	**SOT–90B**	0.7	2.1	80	4.4	5	5	P

Darlington transistor output

type	case	C.T.R. I_F = 1 mA V_{CE} = 1 V min	$V_{(BR)CEO}$ min V	V_{IORM} peak kV (AC)	t_{on} typ I_F = 10 mA V_{CC} = 5 V R_L = 100 Ω µs	t_{off} typ I_F = 10 mA V_{CC} = 5 V R_L = 100 Ω µs	status
CNX48U	**SOT–90B**	5	30	4.4	5	30	P

For detailed information on these and other types see Data Handbook S8b
Standard types

Transistor output

type	case	C.T.R. $I_F = 10$ mA $V_{CE} = 0.4$ V min	C.T.R. $I_F = 10$ mA $V_{CE} = 0.4$ V max	$V_{(BR)CEO}$ min V	V_{IORM} peak kV (AC)	t_{on} typ $I_C = 2$ mA $V_{CC} = 5$ V $R_L = 100\ \Omega$ µs	t_{off} typ $I_C = 2$ mA $V_{CC} = 5$ V $R_L = 100\ \Omega$ µs	status
CNX35	**SOT-90B**	0.4	1.6	30	4.4	3	3	P
CNX39	**SOT-90B**	0.6	1	30	4.4	5.5	4	P
CNX36	**SOT-90B**	0.8	2	30	4.4	8	6	P
CNY57	**SOT-90B**	0.2	0.8	30	4.4	3	3	P
CNY57A	**SOT-90B**	0.4		30	4.4	5*	5*	P

* $I_C = 4$ mA

High-voltage transistor output

type	case	C.T.R. $I_F = 10$ mA $V_{CE} = 0.4$ V min	C.T.R. $I_F = 10$ mA $V_{CE} = 0.4$ V max	$V_{(BR)CEO}$ min V	V_{IORM} peak kV (AC)	t_{on} typ $I_C = 2$ mA $V_{CC} = 5$ V $R_L = 100\ \Omega$ µs	t_{off} typ $I_C = 2$ mA $V_{CC} = 5$ V $R_L = 100\ \Omega$ µs	status
CNX38	**SOT-90B**	0.7	2.1	80	4.4	5	5	P

Darlington transistor output

type	case	C.T.R. $I_F = 10$ mA $V_{CE} = 10$ V min	$V_{(BR)CEO}$ min V	V_{IORM} peak kV (AC)	t_{on} typ $I_C = 2$ mA $V_{CC} = 10$ V $R_L = 100\ \Omega$ µs	t_{off} typ $I_C = 2$ mA $V_{CC} = 10$ V $R_L = 100\ \Omega$ µs	status
CNX48	**SOT-90B**	6	30	4.4	5	30	P

* t_r, t_f
** $I_F = 20$ mA, $R_{be} = 100\ \text{k}\Omega$, $R_L = 2\text{k}\Omega$

For detailed information on these and other types see Data Handbook S8b
Standard types, UL recognized or pending, VDE approved

Transistor output

type	case	C.T.R. I_F = 10 mA V_{CE} = 10 V min	$V_{(BR)CEO}$ min V	V_{IORM} peak kV (AC)	t_{on} typ I_C = 2 mA V_{CC} = 10 V R_L = 100 Ω µs	t_{off} typ I_C = 2 mA V_{CC} = 10 V R_L = 100 Ω µs	status
4N25A	**SOT–90B**	0.2	30	2.8	3*	3*	P
4N26	**SOT–90B**	0.2	30	2.8	3*	3*	P
4N27	**SOT–90B**	0.1	30	2.8	3*	3*	P
4N28	**SOT–90B**	0.1	30	2.8	3*	3*	P
4N25	**SOT–90B**	0.2	30	2.8	3*	3*	P
4N35	**SOT–90B**	1.0	30	4.4	7	5	P
4N36	**SOT–90B**	1.0	30	2.8	7	5	P
4N37	**SOT–90B**	1.0	30	2.8	7	5	P
H11A1	**SOT–90B**	0.5	30	2.8	3*	3*	P
H11A2	**SOT–90B**	0.2	30	2.8	3*	3*	P
H11A3	**SOT–90B**	0.2	30	2.8	3*	3*	P
H11A4	**SOT–90B**	0.1	30	2.8	3*	3*	P
H11A5	**SOT–90B**	0.3	30	2.8	3*	3*	P
MCT2	**SOT–90B**	0.2	30	4.4	5**	10**	P
MCT26	**SOT–90B**	0.06	30	4.4	3*	3*	P

High–voltage transistor output

type	case	C.T.R. I_F = 10 mA V_{CE} = 10 V min	$V_{(BR)CEO}$ min V	V_{IORM} peak kV (AC)	t_{on} typ I_C = 2 mA V_{CC} = 10 V R_L = 100 Ω µs	t_{off} typ I_C = 2 mA V_{CC} = 10 V R_L = 100 Ω µs	status
4N38	**SOT–90B**	0.2	80	2.82	5	5	P
4N38A	**SOT–90B**	0.2	80	2.82	5	5	P

* t_r/t_f
** I_F = 20 mA, R_{be} = 100 kΩ, R_L = 2kΩ

For detailed information on these and other types see Data Handbook S8b
Standard types, UL recognized, VDE approved

High–voltage transistor output

type	case	C.T.R. $I_F = 10$ mA $V_{CE} = 5$ V min	C.T.R. $I_F = 10$ mA $V_{CE} = 5$ V max	$V_{(BR)CEO}$ min V	V_{IORM} peak kV (AC)	t_{on} typ $I_C = 2$ mA $V_{CC} = 10$ V $R_L = 100\ \Omega$ µs	t_{off} typ $I_C = 2$ mA $V_{CC} = 5$ V $R_L = 100\ \Omega$ µs	status
CNY17–1	**SOT–90B**	0.4	0.8	70	4.4	5	5	P
CNY17–3	**SOT–90B**	1	2	70	4.4	5	5	P
CNY17–2	**SOT–90B**	0.63	1.25	70	4.4	5	5	P

Darlington transistor output

type	case	C.T.R. $I_F = 10$ mA $V_{CE} = 5$ V min	C.T.R. $I_F = 10$ mA $V_{CE} = 5$ V max	$V_{(BR)CEO}$ min V	V_{IORM} peak kV (AC)	t_{on} typ $I_C = 2$ mA $V_{CC} = 10$ V $R_L = 100\ \Omega$ µs	t_{off} typ $I_C = 2$ mA $V_{CC} = 5$ V $R_L = 100\ \Omega$ µs	status
H11B1	**SOT–90B**	5*	–	25	2.8	125$^{1)}$	100$^{1)}$	P
H11B2	**SOT–90B**	2*	–	25	2.8	125$^{1)}$	100$^{1)}$	P
H11B3	**SOT–90B**	1*	–	25	2.8	125$^{1)}$	100$^{1)}$	P
H11B255	**SOT–90B**	1	–	55	2.8	125$^{1)}$	100$^{1)}$	P
MCA230	**SOT–90B**	1	–	30	4.4	5$^{2)}$	100$^{2)}$	P
MCA231	**SOT–90B**	2	–	30	4.4	5$^{2)}$	100$^{2)}$	P
MCA255	**SOT–90B**	1	–	55	4.4	5$^{2)}$	100$^{2)}$	P
4N29	**SOT–90B**	1**	–	30	4.4	0.7$^{3)}$	25$^{3)}$	P
4N30	**SOT–90B**	1**	–	30	4.4	0.7$^{3)}$	25$^{3)}$	P
4N31	**SOT–90B**	0.5**	–	30	4.4	0.7$^{3)}$	25$^{3)}$	P
4N32	**SOT–90B**	5**	–	30	4.4	0.7$^{3)}$	25$^{3)}$	P
4N33	**SOT–90B**	5**	–	30	4.4	0.7$^{3)}$	25$^{3)}$	P

* $I_F = 1$ mA
** $V_{CE} = 10$ V

1) $I_C = 10$ mA
2) $I_F = 10$ mA
3) $I_C = 50$ mA, $R_L = 180\ \Omega$

For detailed information on these and other types see Data Handbook S8b
Types for mains applications, UL recognized, VDE approved

Darlington transistor output (cont.)

type	case	C.T.R. $I_F = 10$ mA $V_{CE} = 0.4$ V min	C.T.R. $I_F = 10$ mA $V_{CE} = 0.4$ V max	$V_{(BR)CEO}$ min V	V_{IORM} peak kV (AC)	t_{on} typ $I_C = 2$ mA $V_{CC} = 5$ V $R_L = 100\ \Omega$ µs	t_{off} typ $I_C = 2$ mA $V_{CC} = 5$ V $R_L = 100\ \Omega$ µs	status
CNX62	**SOT–174**	0.4		50	5.3	3	3	P
CNX72	**SOT–90B**	0.4	1.6	30	5.3*	26	2.5	P
CNX82	**SOT–212**	0.4		50	5.3	3	3	P
CNX83	**SOT–212**	0.4		50	5.3	3	3	P
CNX71	**SOT–90B**	0.4	1.6	30	5.3*	20**	120**	P

* VDE approved for 4.4 kV
** Max. values, $I_C = 10$ mA, $V_{CC} = 10$ V, $R_L = 4.7$ kΩ
Note:
CNX82 pin distance 10.16 mm
CNX62 and CNX82 have no base connection

Types with input/output pin distance 15.24 mm

type	case	C.T.R. $I_F = 10$ mA $V_{CE} = 0.4$ V min	$V_{(BR)CEO}$ min V	V_{IORM} kV (AC) peak	t_{on} $I_C = 2$ mA $V_{CC} = 5$ V $R_L = 100\ \Omega$ µs	t_{off} $I_C = 2$ mA $V_{CC} = 5$ V $R_L = 100\ \Omega$ µs	status	
CNX21	**SOT–211**	0.2	30	10	3	3	P	

Types for telephony applications, recognised by French CNET

type	case	C.T.R. $I_F = 10$ mA $V_{CE} = 4$ V min	C.T.R. $I_F = 10$ mA $V_{CE} = 4$ V max	$V_{(BR)CEO}$ min V	V_{IORM} peak kV (AC)	t_{on} typ $I_C = 2$ mA $V_{CC} = 5$ V $R_L = 100\ \Omega$ µs	t_{off} typ $I_C = 2$ mA $V_{CC} = 5$ V $R_L = 100\ \Omega$ µs	status
CNG35	**SOT–90B**	0.4	1.6	30	4.4	3	3	P
CNG36	**SOT–90B**	0.8		30	4.4	8	6	P

For detailed information on these and other types see Data Handbook S8b
GaAlAs types for mains applications, UL recognized, VDE approved

Optocouplers for mains applications

type	case	C.T.R. $I_F = 10$ mA $V_{CE} = 4$ V min	C.T.R. $I_F = 10$ mA $V_{CE} = 4$ V max	$V_{(BR)CEO}$ min V	V_{IORM} peak kV (AC)	t_{on} typ $I_C = 2$ mA $V_{CC} = 5$ V $R_L = 100\ \Omega$ µs	t_{off} typ $I_C = 2$ mA $V_{CC} = 5$ V $R_L = 100\ \Omega$ µs	status
CNG82	**SOT–212**	0.4	1.6	50	5.3	3	3	P
CNG83	**SOT–212**	0.4		50	5.3	3	3	P

For detailed information on these and other types see Data Handbook S8b
For telephony applications approved by British Telecom

Low current types, transistor output

type	case	C.T.R. I_F = 10 mA V_{CE} = 0.5 V min	C.T.R. I_F = 10 mA V_{CE} = 0.5 V max	$V_{(BR)CEO}$ min V	V_{IORM} peak kV (AC)	t_{on} typ I_C = 2 mA V_{CC} = 10 V R_L = 100 Ω µs	t_{off} typ I_C = 2 mA V_{CC} = 10 V R_L = 100 Ω µs	status
PO40/44A	**SOT-90B**	0.6	1.5	30	3.5	7	7	P

High speed type, diode/transistor output

type	case	C.T.R. I_F = 10 mA V_{CE} = 4.5 V min	C.T.R. I_F = 10 mA V_{CE} = 4.5 V max	$V_{(BR)CEO}$ min V	V_{IORM} peak kV (AC)	t_{on} typ I_F = 10 mA V_{CC} = 5 V R_L = 2.5 kΩ µs	t_{off} typ I_F = 10 mA V_{CC} = 5 V R_L = 2.5 kΩ µs	status
CNR36	**SOT-97F**	0.2		18	3.5	0.8	0.8	P
6N135	**SOT-97F**	0.07		15	3.5	1.5	1.5	P
6N136	**SOT-97F**	0.19		15	3.5	0.8	0.8	P
SL5505S	**SOT-97F**	0.2	0.4	22	3.5	0.8	0.8	P

Optocouplers for mains applications

type	case	C.T.R. I_F = 10 mA V_{CE} = 0.4 V min	C.T.R. I_F = 10 mA V_{CE} = 0.4 V max	$V_{(BR)CEO}$ min V	V_{IORM} peak kV (AC)	t_{on} typ I_C = 2 mA V_{CC} = 5 V R_L = 100 Ω µs	t_{off} typ I_C = 2 mA V_{CC} = 5 V R_L = 100 Ω µs	status
CNX62A	**SOT-230**	0.4		50	5.3	3	3	P
CNX72A	**SOT-229**	0.4	1.6	30	5.3*	26[1)]	2.5[1)]	P
CNX82A	**SOT-231**	0.4		50	5.3	3	3	P
CNX83A	**SOT-231**	0.4		50	5.3	3	3	P
CNW82	**SOT-228**	0.4		50	8.3	3	3	P
CNW83	**SOT-228**	0.4		50	8.3	3	3	P

1) t_{on}/t_{off} = max values. R_{BE} = 56 kΩ. R_L = 1 kΩ.
2) t_{on}/t_{off} measured at I_F.
3) I_F = 16 mA.
* for VDE 4.4 kV

CNX82A/83A and CNW82/83 have 10.16 mm pin spacing
CNX82A and CNW82 have no base connection

LCDs features and product options

For detailed information on these types see Data Handbook S14

Features of LCDs
- very low power consumption
- low operating voltage
- easy to drive/CMOS compatible
- excellent legibility under most ambient light conditions
- expected life time > 100 000 hours

Available product variations
- reflective, transflective or transmissive versions
- positive or negative image
- various electro–optical specifications
- commercial or extended temperature ranges
- connection with fixed pins or for elastomer connector(elastomer connectors not supplied)

Standard products
A range of standard products are available. For more information refer to Handbook S14.

Standard LCD cells
A range of standard LCD cells are available for multiple applications fields e.g. clocks, counters, point of sales equipment etc.

Standard LCD modules
A range of standard LCD modules are available for multiple applications fields. An LCD module combines an LCD cell with driver circuitry in a compact unit. Our LCD modules are classified as:

segment types (mainly for application in telephony equipment)
character types, displaying 1 or more lines of 5 x 7 characters (used in a variety of applications e.g. typewriters, point of sales equipment etc).
dot matrix types intended for full graphic applications e.g. PCs, measuring equipment etc.

LCDs custom design facilities

For detailed information on these types see Data Handbook S14

Custom design facilities
We offer a complete custom design service for LCD cells in which the following can be customer specified:

- dimensions
- display pattern
- electro–optical characteristics
- connection method

Our custom design facility has been divided into two categories: semi–standard products and custom products each category has different priorities on design flexibility versus development cost.

Semi–standard productsare a custom designed display pattern incorporated with a variety of standfard options. These options include a range of standard glass sizes and a selection of electro–optical characteristics. Semi–standard products are characterized by simple product definition, fast development time and low development cost.

For more information please refer to the Data Handbook S14 which has a section dedicated to semi–standard
products, or to the nearest Philips Components sales organization (see back cover for details).

Custom products offer more flexibility in dimensions and electro–optical characteristics and are best suited to when semi–standard products do not meet with user requirements.

For more information please refer to the Data Handbook S14 which has a section dedicated to custom products, or to the nearest Philips Components sales organization (see back cover for details).

For detailed information on these types see Data Handbook S14

extended type no.	illumination mode	quality grade*	dimensions (mm) excluding pins		drive method**	connection method	family characteristics
			width	height			
LTA141R–12	reflective	comm.	50.8	80.0	DD	with pins	TR0
LTA141F–12	transflective	comm.	50.8	80.0	DD	with pins	TF0
LTA141R–22	reflective	ext.	50.8	80.0	DD	with pins	TR2
LTA141F–22	transflective	ext.	50.8	80.0	DD	with pins	TF2
LTA142U–12	transmissive	comm.	51.0	80.0	DD	with pins	TR0
LTA331R–11	reflective	comm.	69	23	MUX 1:16	for elastomer	–
LTA331F–11	transflective	comm.	69	23	MUX 1:16	for elastomer	–
LTA332R–11	reflective	comm.	69	25	MUX 1:16	for elastomer	–
LTA332F–11	transflective	comm.	69	25	MUX 1:16	for elastomer	–
LTA341R–11	reflective	comm.	94	35	MUX 1:16	for elastomer	–
LTA341F–11	transflective	comm.	94	35	MUX 1:16	for elastomer	–
LTA342R–11	reflective	comm.	94	35	MUX 1:16	for elastomer	–
LTA342F–11	transflective	comm.	94	35	MUX 1:16	for elastomer	–
LTA343R–11	reflective	comm.	160	27	MUX 1:16	for elastomer	–
LTA343F–11	transflective	comm.	160	27	MUX 1:16	for elastomer	–
LTD101R–11	reflective	comm.	50.8	22.9	DD	for elastomer	TR0
LTD132R–11	reflective	comm.	46.8	54.8	MUX 1:2	for elastomer	TR1
LTD133F–21	transflective	comm.	38.6	20.8	MUX 1:2	for elastomer	TR3
LTD201R–11	reflective	comm.	23.9	14.0	DD	for elastomer	TR0
LTD202R–12	reflective	comm.	27.9	30.4	DD	with pins	TR0
LTD202R–22	reflective	ext.	27.9	30.4	DD	with pins	TR2
LTD202F–22	transflective	ext.	27.9	30.4	DD	with pins	TF2
LTD203R–11	reflective	comm.	38.0	20.3	DD	for elastomer	TR0
LTD203R–21	reflective	ext.	38.0	20.3	DD	for elastomer	TR2
LTD203F–21	transflective	ext.	38.0	20.3	DD	for elastomer	TF2
LTD211R–11	reflective	comm.	38.0	20.3	MUX 1:2	for elastomer	TR1
LTD211F–11	translective	comm.	38.0	20.3	MUX 1:2	for elastomer	TF1
LTD211R–21	reflective	ext.	38.0	20.3	MUX 1:2	for elastomer	TR2
LTD211F–21	translective	ext.	38.0	20.3	MUX 1:2	for elastomer	TF2
LTD221R–11	reflective	comm.	50.8	30.4	DD	for elastomer	TR0
LTD221R–12	reflective	comm.	50.8	30.4	DD	with pins	TR0
LTD221F–12	transflective	comm.	50.8	30.4	DD	with pins	TR2
LTD221R–22	reflective	ext.	50.8	30.4	DD	with pins	TF0
LTD221F–22	transflective	ext.	50.8	30.4	DD	with pins	TF2
LTD222R–11	reflective	comm.	50.8	30.4	DD	for elastomer	TR0
LTD222R–12	reflective	comm.	50.8	30.4	DD	with pins	TR0
LTD222F–12	transflective	comm.	50.8	30.4	DD	with pins	TF0
LTD222R–21	reflective	comm.	50.8	30.4	DD	for elastomer	TR2
LTD222F–21	transflective	comm.	50.8	30.4	DD	for elastomer	TF2
LTD222R–22	reflective	ext.	50.8	30.4	DD	with pins	TR2
LTD222F–22	transflective	ext.	50.8	30.4	DD	with pins	TF2
LTD224R–11	reflective	comm.	50.8	30.4	DD	for elastomer	TR0
LTD225R–11	reflective	comm.	50.8	30.4	DD	for elastomer	TR0
LTD226R–11	reflective	comm.	50.8	30.4	DD	for elastomer	TR0
LTD226R–12	reflective	comm.	50.8	30.4	DD	with pins	TR0
LTD226F–12	transflective	comm.	50.8	30.4	DD	with pins	TF0
LTD226R–21	reflective	ext.	50.8	30.4	DD	for elastomer	TR2
LTD226F–21	transflective	ext.	50.8	30.4	DD	for elastomer	TF2
LTD226R–22	reflective	ext.	50.8	30.4	DD	with pins	TR2
LTD226F–22	transflective	ext.	50.8	30.4	DD	with pins	TF2

* comm. = commercial quality grade
ext. = extended quality grade
** DD = direct drive.

note:
all types are positive image mode except
LTA142U–12 which has a negative image

For detailed information on these types see Data Handbook S14

extended type no.	illumination mode	quality grade*	dimensions (mm) excluding pins		drive method**	connection method	family characteristics
			width	height			
LTD227R–12	reflective	comm.	50.8	30.4	DD	with pins	TR0
LTD227R–22	reflective	ext.	50.8	30.4	DD	with pins	TR2
LTD227F–22	transflective	ext.	50.8	30.4	DD	with pins	TF2
LTD228R–12	reflective	comm.	50.8	30.4	DD	with pins	TR0
LTD229R–12	reflective	comm.	50.8	30.4	DD	with pins	TR0
LTD229R–22	reflective	ext.	50.8	30.4	DD	with pins	TR2
LTD229F–22	transflective	ext.	50.8	30.4	DD	with pins	TF2
LTD231R–11	reflective	comm.	50.8	30.4	MUX 1:3	for elastomer	TR1
LTD232R–11	reflective	comm.	50.8	30.4	MUX 1:3	for elastomer	TR1
LTD233R–11	reflective	comm.	69.8	20.3	MUX 1:2	for elastomer	TR1
LTD234R–11	reflective	comm.	69.8	20.3	MUX 1:4	for elastomer	TR2
LTD241R–12	reflective	comm.	69.8	38.0	DD	with pins	TR0
LTD241R–22	reflective	ext.	69.8	38.0	DD	with pins	TR2
LTD241F–22	transflective	ext.	69.8	38.0	DD	with pins	TF2
LTD242R–12	reflective	comm.	69.8	38.0	DD	with pins	TR0
LTD242R–22	reflective	ext.	69.8	38.0	DD	with pins	TR2
LTD242F–22	transflective	ext.	69.8	38.0	DD	with pins	TF2
LTD261R–12	reflective	comm.	76.2	101.6	DD	with pins	TR0
LTD261R–22	reflective	ext.	76.2	101.6	DD	with pins	TR2
LTD261F–22	transflective	ext.	76.2	101.6	DD	with pins	TF2
LTD262R–12	reflective	comm.	93.8	30.8	DD	with pins	TR0
LTD262R–22	reflective	ext.	93.8	30.8	DD	with pins	TR2
LTD262F–22	transflective	ext.	93.8	30.8	DD	with pins	TF2
LTD263R–12	reflective	comm.	93.8	38.0	DD	with pins	TR0
LTD263R–22	reflective	ext.	93.8	38.0	DD	with pins	TR2
LTD264R–22	reflective	ext.	114.0	46.0	DD	with pins	TR2
LTD264F–22	transflective	ext.	114.0	46.0	DD	with pins	TF2
LTD321R–12	reflective	comm.	69.8	30.4	DD	with pins	TR0
LTD351R–11	reflective	comm.	26.0	114.0	MUX 1:2	for elastomer	TR1

* comm. = commercial quality grade
ext. = extended quality grade

** DD = direct drive.

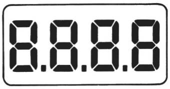
Standard LCD modules

For detailed information on these types see Data Handbook S14

extended type no.	description	illumination mode	dimensions (mm) excluding pins		drive method
			width	height	
Segment types					
LP–1471–B	16–digit module with I^{2}C	reflective	92.5	25.0	MUX 1:2
LTM233R–10	16–digit module	reflective	92.5	25.0	MUX 1:2
Character types					
LTN111R–10	16 character 5 x 7 dot 1–line module	reflective	80.0	36.0	MUX 1:16
LTN111F–10	16 character 5 x 7 dot 1–line module	transflective	80.0	36.0	MUX 1:16
LTN211R–10	16 character 5 x 7 dot 2–line module	reflective	84.0	44.0	MUX 1:16
LTN211F–10	16 character 5 x 7 dot 2–line module	transflective	84.0	44.0	MUX 1:16
LTN242R–10	40 character 5 x 7 dot 2–line module	reflective	182.0	33.5	MUX 1:16
LTN242F–10	40 character 5 x 7 dot 2–line module	transflective	182.0	33.5	MUX 1:16
Graphic full dot types					
LBG402R–10	graphic full dot module	reflective	256.0	128	MUX 1:100
LBG402F–10	graphic full dot module	transflective	256.0	128	MUX 1:100
LBG403R–10	graphic full dot module	reflective	256.0	128	MUX 1:100
LBG403F–10	graphic full dot module	transflective	256.0	128	MUX 1:100
LTG201R–10	graphic full dot module	reflective	180.0	75.0	MUX 1:64

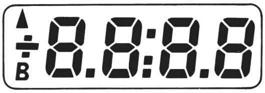
For detailed information on these types see Data Handbook S14

LTD201



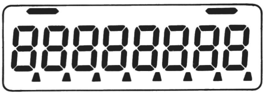
7Z22297

LTD203



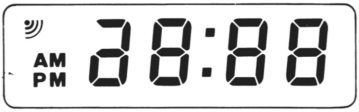
7Z22299

LTD211



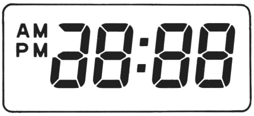
7Z22300

LTD101



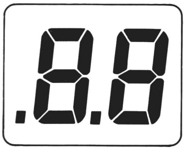
7Z22295

LP-2703



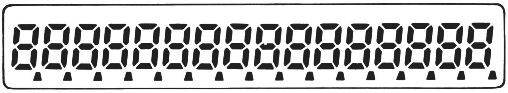
7Z22271

LTD202



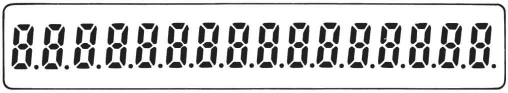
7Z22298

LTD233



7Z22311

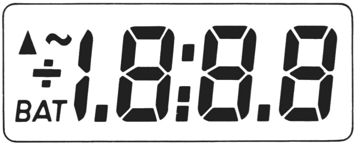
LTD234



7Z22312

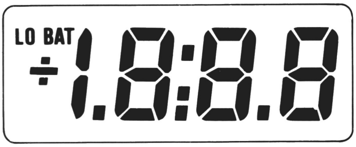
For detailed information on these types see Data Handbook S14

LTD221



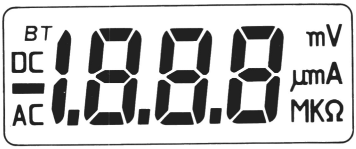
7Z22301

LTD222



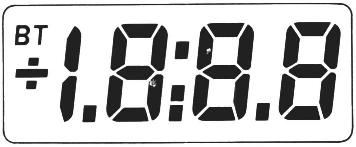
7Z22302

LTD224


BT
DC
AC
mV
µmA
MKΩ

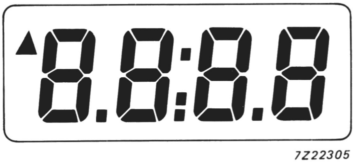
7Z22303

LTD225



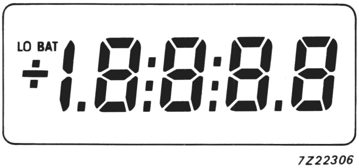
7Z22304

LTD226



7Z22305

LTD227

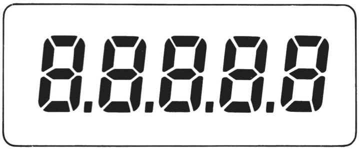


7Z22306

Optical selection guide (cont.)

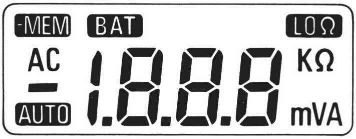
For detailed information on these types see Data Handbook S14

LTD228



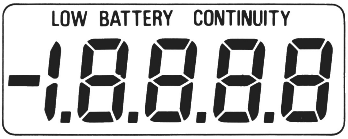
7Z22307

LTD231


-MEM
BAT
LOΩ
AC
KΩ
AUTO
1.8.8.8
mVA

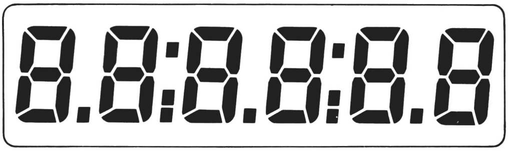
7Z22309

LTD232


LOW BATTERY CONTINUITY
-1.8.8.8.8

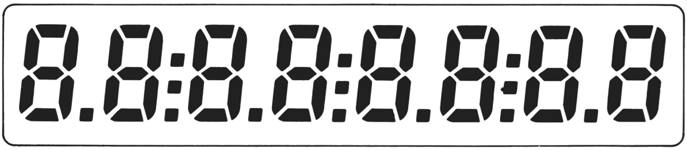
7Z22310

LTD229



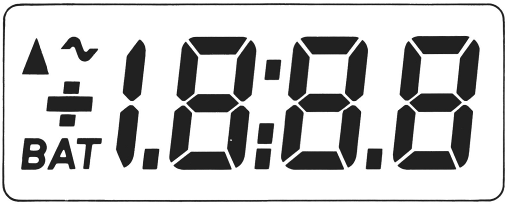
7Z22308

LTD262



7Z22315

LTD241

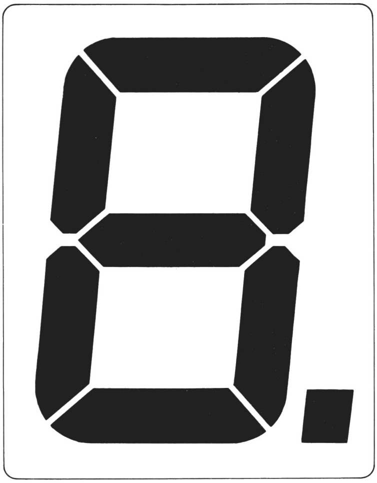


7Z22313

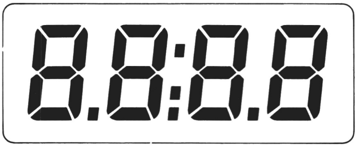
Optical selection guide (cont.)

For detailed information on these types see Data Handbook S14

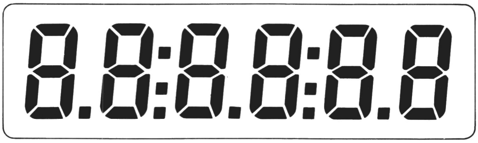
LTD261



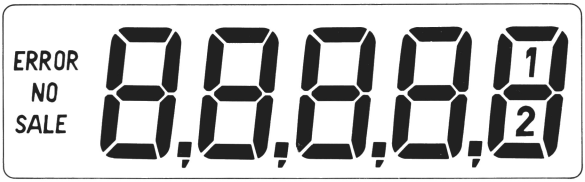
LTD242



LTD263



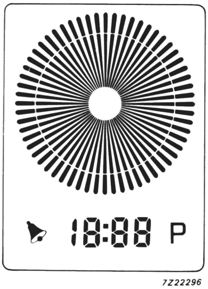
LTD264


ERROR
NO
SALE
1
2
7Z22317

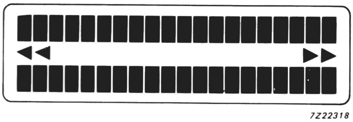
Optical selection guide (cont.)

For detailed information on these types see Data Handbook S14

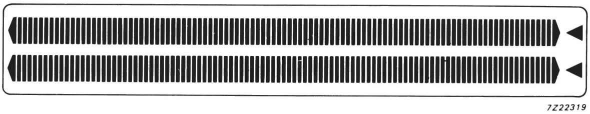
LTD132


18:88 P
7Z22296

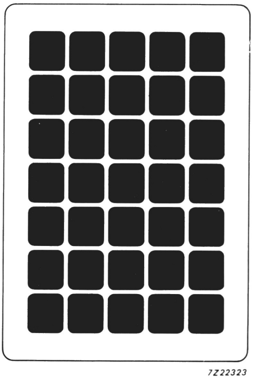
LTD321



LTD351



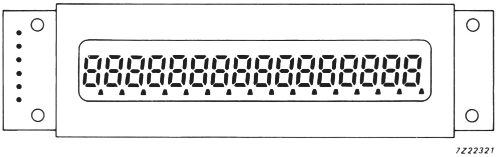
LTA141



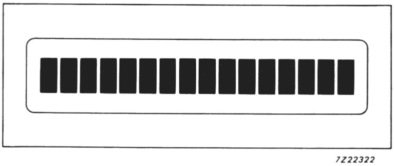
Optical selection guide (cont.)

For detailed information on these types see Data Handbook S14

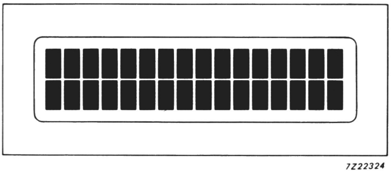
LTM233



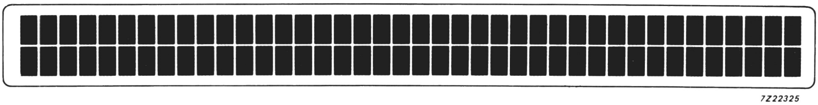
LTN111



LTN211



LTN241



Operating characteristics extended quality grade

For detailed information on family characteristics see Data Handbook S14

TR0, TF0**

parameter	symbol		drive method DD*	unit
operating voltage	V_{op}	min typ max	3.0 4.5 6.0	V V V
operating ambient temperature	T_{amb}	min typ max	−10 – +60	°C °C °C
turn on time	t_{on}			
T_{amb} 25°C			40	ms
T_{amb} 0°C			200	ms
turn off time	t_{off}			
T_{amb} 25°C			80	ms
T_{amb} 0°C			150	ms
specific capacitance	C_s		11	pF/mm^2
specific current consumption	I_s		10	nA/mm^2
frame frequency	f_{dr}	min max	30 200	Hz Hz

* DD = direct drive

** TR = transmissive, TF = transflective

Operating characteristics extended quality grade

For detailed information on family characteristics see Data Handbook S14

TR1, TF1

parameter	symbol		drive method DD*	1:2	1:3	1:4	unit
operating voltage	V_{op}	min typ max	2.5 4.5 6.0	– 2.8 –	– 3.1 –	– 3.2 –	V V V
operating ambient temperature	T_{amb}	min typ max	−10 – +60	−10 – +50	−10 – +50	−10 – +40	°C °C °C
turn on time	t_{on}						
T_{amb} 25°C			50	150	180	160	ms
T_{amb} 0°C			250	1000	1200	1400	ms
turn off time	t_{off}						
T_{amb} 25°C			90	90	60	75	ms
T_{amb} 0°C			400	300	300	300	ms
specific capacitance	C_s		15	15	15	15	pF/mm²
specific current consumption	I_s		15	15	22	22	nA/mm²
frame frequency	f_{dr}	min max	30 200	30 100	30 100	30 100	Hz Hz

* DD = direct drive

Operating characteristics extended quality grade

For detailed information on family characteristics see Data Handbook S14

TR2, TF2

			drive method				
parameter	symbol		DD*	1:2	1:3	1:4	unit
operating voltage	V_{op}	min	3.0	–	–	–	V
		typ	4.5	3.9	4.4	4.5	V
		max	6.0	–	–	–	V
operating ambient temperature	T_{amb}	min	−25	−25	−25	−20	°C
		typ	–	–	–	–	°C
		max	+80	+80	+50	+50	°C
turn on time	t_{on}						
T_{amb} 25°C			40	75	90	100	ms
T_{amb} 0°C			200	300	450	500	ms
turn off time	t_{off}						
T_{amb} 25°C			80	40	50	40	ms
T_{amb} 0°C			150	180	110	150	ms
specific capacitance	C_s		11	11	11	11	pF/mm²
specific current consumption	I_s		10	10	15	15	nA/mm²
frame frequency	f_{dr}	min	30	30	30	30	Hz
		max	200	100	100	100	Hz

* DD = direct drive

Standard LCD modules

For detailed information on these types see Data Handbook S14

extended type no.	description	illumination mode	character size mm	dot size mm	supply voltage V
Segment types					
LP–1471–B	16–digit module with I^2C	reflective	32 x 6.0		+3
LTM233R–10	16–digit module	reflective	32 x 6.0		+3
Character types					
LTN111R–10	16 character 5 x 7 dot 1–line module	reflective	3.07 x 5.73	0.55 x 0.75	+5
LTN111F–10	16 character 5 x 7 dot 1–line module	transflective	3.07 x 5.73	0.55 x 0.75	+5
LTN211R–10	16 character 5 x 7 dot 2–line module	reflective	2.96 x 4.86	0.56 x 0.66	+5
LTN211F–10	16 character 5 x 7 dot 2–line module	transflective	2.96 x 4.86	0.56 x 0.66	+5
LTN221R–10	20 character 5 x 7 dot 2–line module	reflective	3.2 x 5.55	0.6 x 0.65	+5
LTN221F–10	20 character 5 x 7 dot 2–line module	transflective	3.2 x 5.55	0.6 x 0.65	+5
LTN222R–10	24 character 5 x 7 dot 2–line module	reflective	2.7 x 5.55	0.5 x 0.65	+5
LTN222F–10	24 character 5 x 7 dot 2–line module	transflective	2.7 x 5.55	0.5 x 0.65	+5
LTN242R–10	40 character 5 x 7 dot 2–line module	reflective	3.2 x 4.85	0.6 x 0.65	+5, –5
LTN242F–10	40 character 5 x 7 dot 2–line module	transflective	3.2 x 4.85	0.6 x 0.65	+5, –5
Graphic full dot types					
LBG402R–10	graphic full dot module	reflective	0.35 x 0.49	0.48 x 0.48	+5, –13
LBG402F–10	graphic full dot module	transflective	0.35 x 0.49	0.48 x 0.48	+5, –13
LBG403R–10	graphic full dot module	reflective	0.35 x 0.49	0.48 x 0.48	+5, –12
LBG403F–10	graphic full dot module	transflective	0.35 x 0.49	0.48 x 0.48	+5, –12
LTG201R–10	graphic full dot module	reflective	2.6 x 3.66	0.48 x 0.48	+5, –11

For detailed information on these types see Data Handbook S14

LCD drivers

type no.	description
Dedicated drivers	
PCF2100	C bus control, 40–segments
PCF2110	C bus control, 60–segments, 2 LEDs
PCF2111	C bus control, 64–segments
PCF2112	C bus control, 32–segments
PCF8566	I^2C bus control, universal multiplex drive, 1:2 to 1:4 MUX ratios (24 segs)
PCF8576	I^2C bus control, universal multiplex drive, 1:2 to 1:4 MUX ratios (40 segs)
PCF8577	I^2C bus control, direct drive (32 segs) duplex drive (64 segs)
PCF2201	Flat panel ROW/COLUMN driver
PCF8578	Flat panel ROW/COLUMN driver
PCF8579	Flat panel COLUMN driver
PCF1303T	18–segment bargraph display LCD driver, with analog input
HEF4754V	18–segment bargraph display LCD driver
PC74HC4543	BCD to 7–segment latch/decoder/driver for LCD
PC74HCT4543	
HEF4543B	BCD to 7–segment latch/decoder/driver for LED and LCD
PCF1171	4–digit LCD car clock circuit
PCF1172	3 1/2–digit LCD car clock circuit
PCF1174	4–digit LCD car clock circuit
PCF1175	4–digit, duplex drive LCD car clock circuit

Class A bipolar medium power transistors

For detailed information on these types see data handbook S11
Products supplied as single units

status = C

Class–A medium power

type	f GHz	V_{CE} V	I_C mA	P_{L1}* mW	G_{po}** dB
LAE6000Q***	2	10	4	–	–
LBE2003S	2	18	30	250	11
LCE2003S	2	18	30	250	11
LUE2003S	2	18	30	250	11
LBE2009S	2	18	110	900	9.8
LCE2009S	2	18	110	900	9.8
LUE2009S	2	18	110	900	9.8
LTE21009R	2.1	16	150	1000	8.5
LTE21015R	2.1	16	250	1600	8.1
LTE21025R	2.1	16	400	2800	7.8
LVE21050R	2.1	16	1100	5500	8
LWE2015R	2.3	16	250	1600	8.1
LWE2025R	2.3	16	400	2800	7.8
LAE4001R	4	15	25	110	9.5
LAE4002S	4	18	30	160	8
LTE4002S	4	18	30	160	8
LTE42005S	4.2	18	110	550	7.2
LTE42008R	4.2	16	250	940	7.5
LTE42012R	4.2	16	400	1250	7

* Load power for 1 dB compressed power gain
** Low–level power gain associated with P_{L1}
*** Low–noise type

Class A bipolar high power transistors

For detailed information on these types see data handbook S11
Products supplied as single units

Status = C

Class–A high power (wideband)

type	f GHz	V_{CE} V	I_C A	P_{L1}* W	G_{po}** dB
LZ1418E100R	1.4 to 1.8	16	2	11	11
LV1721E50R	1.7 to 2.1	16	1.1	5.5	8
LV2024E45R	2.0 to 2.4	16	1.1	5	7
LV2327E40R	2.3 to 2.7	16	1	5	8
LV2931E50S	2.9 to 3.1	18	1	5	6.5

* Load power for 1 dB compressed power gain
** Low–level power gain associated with P_{L1}

Class C bipolar power transistors

For detailed information on these types see data handbook S11
Products supplied as single units

Status = C

Class–C medium power

type	f GHz	V_{CE} V	P_L W	G_p dB	η_C %
PTB23001X	2	24	1.8	9	50
PTB23003X	2	24	4.0	10	50
PTB23005X	2	24	7.0	11	50
PTB32001X	3	24	1.8	9.5	45
PTB32003X	3	24	3.0	9.5	40
PTB32005X	3	24	5.5	9.5	40
PTB42001X	4.2	24	1.0	6	33
PTB42002X	4.2	24	2.0	6	35
PTB42003X	4.2	24	3.0	6	33
PVB42004X	1	24	13	11	60
	2	24	10	10	48
	3	24	7.5	8.8	30
	4	24	4	6	25

Class–C high power

type	f GHz	V_{CE} V	P_L W	G_p dB	η_C %	
PZ1418B15U	1.4 to 1.8	28	15	7.8	45	
PZ1418B30U	1.4 to 1.8	28	35	8.4	45	
PZB16035U	1.64	28	38	9.8	50	
PZB16040U	1.64	28	45	9	45	
PZ1721B12U	1.7 to 2.1	28	16	8	45	
PZ1721B25U	1.7 to 2.1	28	30	7.8	41	
PZ2024B10U	2.0 to 2.4	28	12	6.8	45	
PZ2024B20U	2.0 to 2.4	28	26	7	42	
PZ2327B15U	2.3 to 2.7	28	16	8	45	

Oscillator power transistors

For detailed information on these types see data handbook S11
Products supplied as single units

Status = C

Oscillator power transistors

type	f GHz	V_{CE} V	I_C mA	P_L mW	case
PPC5001T	5	20	200	450	FO–102
PQC5001T	5	20	200	450	FO–85

Bipolar transistors: pulsed power types

For detailed information on these types see data handbook S11
Products supplied as single units

Radar pulsed power transistors

Status = C

L–band

type	f GHz	V_{CC} V	t_p at µs	δ %	P_L W	G_p dB	η_C %
RZ1214B35Y	1.2 to 1.4	42	50	10	40	7.8	40
	1.2 to 1.4	50	300	10	40	7	35
RZ1214B65Y	1.2 to 1.4	42	50	10	80	7	38
	1.2 to 1.4	50	300	10	80	7	30
RZ1214B125Y	1.2 to 1.4	42	50	10	150	7	38
	1.2 to 1.4	50	300	10	150	7	30
RX1214B150W	1.2 to 1.4	40	1000	10	150	7	42
	1.2 to 1.4	50	150	5	240	9	45
RX1214B300Y	1.2 to 1.4	50	300	5	300	7.5	35
	1.2 to 1.4	50	300	5	320	8	38

S–band

type	f GHz	V_{CC} V	t_p at µs	δ %	P_L W	G_p dB	η_C %
RV2833B5X	2.8 to 3.3*	24	100	10	5.6	5.7	47
RV3135B5X	3.1 to 3.5	24	100	10	5.6	5.7	47
RZ2833B15W	2.8 to 3.3*	40	100	10	18	5.5	33
RZ3135B15W	3.1 to 3.5	40	100	10	18	5.5	33
RZ2833B30W	2.8 to 3.3*	40	100	10	34	5.5	33
RZ3135B30W	3.1 to 3.5	40	100	10	34	5.5	33
RZ2731B45W	2.7 to 3.1	40	100	10	45	7	40
RZ2833B45W	2.8 to 3.3	40	100	10	45	7	37
RZ3135B40W	3.1 to 3.5	40	100	10	40	6.4	35
RZ2731B60W	2.7 to 3.1	40	100	10	70	6.3	65
RZ2833B60W	2.8 to 3.3	40	100	10	60	6	37
RZ3135B50W	3.1 to 3.5	40	100	10	55	5.6	35
RZ2731B90W	2.7 to 3.1	40	100	10	100	6.5	40
RX3034470W	3.0 to 3.4	40	100	10	80	6	35

* may also be used for 2.7 to 3.1 GHz

Bipolar transistors: pulsed power types

For detailed information on these types see data handbook S11
Products supplied as single units

Avionics pulsed power transistors

type	f GHz	V_{CC} V	t_p at µs	δ %	P_L W	G_p dB	η_C %
MRB11080Y	1.09	50	10	1	100	8.5	40
MRB11175Y	1.09	50	10	1	200	8.5	40
MRB11350Y	1.09	50	10	1	400	8	35
MRB11900Y	1.09	50	10	1	850	7.5	35
RZB12050Y	1.09	50	100	10	50	10	45
	1.09	50	300	10	100	10	40
	1.09	50	–	–	100	9	40
RZB12100Y	1.09	50	100	10	100	10	45
	1.09	50	300	10	100	10	40
	1.09	50	–	–	100	9	40
RZB12250Y	1.09	50	100	10	250	7.5	25
	1.09	50	300	10	200	7.0	30
	1.09	50	–	–	100	9.0	30
RXB12350Y	1.09	50	100	10	350	7.8	38
	1.09	50	300	10	300	7.5	35
	1.09	50	–	–	300	7.5	35
RX1011B250Y	1.03–1.09	50	300	10	250	7.5	40
RX1011B350Y	1.03–1.09	50	300	10	250	7.5	40

Low noise and Class A power Ga As FETs

For detailed information on these types see data handbook S11
Products supplied as single units

Status = C

type	f GHz	V_{DS} V	I_D A	P_{L1}* mW	N_F dB	G_{po}** dB	G_a dB	case
CFX16–26	12	3	10	–	2.3	–	8	FO–92
CFX16–29	12	3	10	–	2.7	–	7.5	FO–92
CFX17–19	12	3	10	–	1.8	–	8.5	FO–92
CFX17–21	12	3	10	–	2.0	–	8.5	FO–92
CFX17–23	12	3	10	–	2.2	–	8.5	FO–92
CFX17–26	12	3	10	–	2.4	–	8	FO–92
CFX22	12	5	50	80	–	9	–	FO–92
CFX30	11	8	50	125	–	8	–	FO–85
CFX31	11	8	100	280	–	8	–	FO–85
CFX32	6	8	180	550	–	8.5	–	FO–85
	8.5	8	180	550	–	7.5	–	
CFX33	6	8	370	1100	–	7.0	–	FO–85
	8.5	8	370	1100	–	5.5	–	

* Load power for 1 dB compressed power gain
** Low–level power gain associated with P_{L1}

Type number survey
Accessories

For detailed information on these types refer to our Data Handbook System

	type	description	case application
Accessories	**56201j**	Insulating bushes (height 5 mm)	TO–3
	56201d	Mica washer	TO–3
	56245	Distance disc of insulating material	TO–5; TO–39
	56246	Distance disc of insulating material	TO–18; TO–72
	56261a	2 insulating bushes (height 6,5 mm)	TO–3
	56264a	Mica washer	DO–5; TO–48
	56264b	Insulating bush	TO–48; DO–5 TO–48
	56295a	mica washer	DO–4; TO–64
	56295b	PTFE ring	
	56295c	insulating bush	
	56326	Metal washer	TO–126 (SOT–32)
	56339	Mica washer	TO–3
	56352	Mounting support	TO–3
	56353	Clip	TO–126; SOT–82
	56354	Mica insulator	TO–126; SOT–82
	56359b	Mica insulator	TO–220
	56359c	Insulating bush	TO–220
	56359d	Rectangular insulating bush	TO–220
	56360a	Rectangular washer	TO–220
	56363	Clip (direct mounting)	TO–220
	56364	Clip; to be used in conjunction with 56367 or 56369	TO–220
	56367	Alumina insulators, to be used in conjunction with 56364	TO–220
	56368a	Mica insulator	SOT–93
	56368b	Insulating bush	SOT–93
	56369	Mica insulator, to be used with 56364	TO–220
	56378	Mica insulator	SOT–93
	56379	Clip	SOT–93
	56387a	Mica insulator (up to 300 V)	TO–126
	56387b	Insulating bush (up to 300 V)	TO–126

More detailed information on these types can be supplied on request

KTY81–1 series

type number	nominal resistance T_{amb} = 25°C Ω	measuring temperature range °C	temperature coefficient at 25 °C %/K	operating current mA
KTY81–110	990–1010	–55 to +150	0.79	1
KTY81–120	980–1020	–55 to +150	0.79	1
KTY81–121	980–1000	–55 to +150	0.79	1
KTY81–122	1000–1020	–55 to +150	0.79	1
KTY81–150	950–1050	–55 to +150	0.79	1
KTY81–151	950–1000	–55 to +150	0.79	1
KTY81–152	1000–1050	–55 to +150	0.79	1

KTY81–2 series

type number	nominal resistance T_{amb} = 25°C Ω	measuring temperature range °C	temperature coefficient at 25 °C %/K	operating current mA
KTY81–210	1980–2020	–55 to +150	0.79	1
KTY81–220	1960–2040	–55 to +150	0.79	1
KTY81–221	1960–2000	–55 to +150	0.79	1
KTY81–222	2000–2040	–55 to +150	0.79	1
KTY81–250	1900–2100	–55 to +150	0.79	1
KTY81–251	1900–2000	–55 to +150	0.79	1
KTY81–252	2000–2100	–55 to +150	0.79	1

KTY83–1 series

type number	nominal resistance T_{amb} = 25°C Ω	measuring temperature range °C	temperature coefficient at 25 °C %/K	operating current mA
KTY83–110	990–1010	–55 to +175	1.67	1
KTY83–120	980–1020	–55 to +175	1.67	1
KTY83–121	980–1000	–55 to +175	1.67	1
KTY83–122	1000–1020	–55 to +175	1.67	1
KTY83–150	950–1050	–55 to +175	1.67	1
KTY83–151	950–1000	–55 to +175	1.67	1
KTY83–152	1000–1050	–55 to +175	1.67	1

More detailed information on these types can be supplied on request

KTY84–1 series

type number	nominal resistance T_{amb} = 100°C Ω	measuring temperature range °C	temperature coefficient at 25 °C %/K	operating current mA
KTY84–130	970–1030	0 to +300	0.61	2
KTY84–150	950–1050	0 to +300	0.61	2
KTY84–151	950–1000	0 to +300	0.61	2
KTY84–152	1000–1050	0 to +300	0.61	2

KTY85–1 series

type number	nominal resistance T_{amb} = 25°C Ω	measuring temperature range °C	temperature coefficient at 25 °C %/K	operating current mA
KTY85–110	990–1010	–40 to +125	0.76	1
KTY85–120	980–1020	–40 to +125	0.76	1
KTY85–121	980–1000	–40 to +125	0.76	1
KTY85–122	1000–1020	–40 to +125	0.76	1
KTY85–150	950–1050	–40 to +125	0.76	1
KTY85–151	950–1000	–40 to +125	0.76	1
KTY85–152	1000–1050	–40 to +125	0.76	1

KTY86–2 series

type number	nominal resistance T_{amb} = 25°C Ω	measuring temperature range °C	temperature coefficient at 25 °C %/K	operating current mA
KTY86–205	1890–1910	–40 to +150	0.76	0.1

KTY87–2 series

type number	nominal resistance T_{amb} = 25°C Ω	measuring temperature range °C	temperature coefficient at 25 °C %/K	operating current mA
KTY87–205	1890–1910*	–40 to +125	0.75	0.1

* nominal resistance at T_{amb} = 100 °C = 3327–3361 Ω

Monolithic membrane pressure sensors / Magnetic field sensors

More detailed information on these types can be supplied on request

Monolithic membrane pressure sensors

type	characteristics				
	pressure range	application mode	operating voltage (V)	sensitivity at $T_{amb} = 25°C$	internal temp. compensation
KP100A	0 to 2 bar	absolute	7.5	60 mV/bar	yes
KP100A1	0 to 2 bar	absolute	5	40 mV/bar	yes
KP101A	0 to 1.2 bar	absolute	7.5	40 mV/bar	yes
KPZ20G	−1 to +2 bar	relative	7.5	79 mV/bar	no
KPZ21G	−1 to +10 bar	relative	7.5	26 mV/bar	no
KPZ21GE	−1 to +10 bar	relative	6.1	500 mV/bar	yes

Magnetic field sensors

type	magnetic field range	sensitivity mVm/kA	recommended aux. field kA/m	supply voltage V
KMZ10A	0 to ±0.5 kA/m	70	0.5	5
KMZ10A1*	0 to ±0.5 kA/m	70	0.5	5
KMZ10B	0 to ±2.0 kA/m	20	3	5
KMZ10C	0 to ±7.5 kA/m	7.5	3	5

* identical to KZM101A except direction of magnetic sensitivity is rotated by 90°

Guide to packing quantities

SPQ = smallest packing quantity
PQ = packing quantity

case	packing description	SPQ	PQ
DO–4	box	25	250
DO–5	box	10	100
DO–7	tape	7000	7000
DO–30	box	1	8
DO–34	reel	10000	10000
DO–35	reel	5000	5000
DO–41	reel	5000	5000
FO38	tray/box	25	75
FO41	box	1	–
FO45	box	1	–
FO46	box	1	–
FO49	tray/box	25	75
FO53	box	1	–
FO57	box	1	–
FO58	box	1	–
FO67	box	1	–
FO83	box	1	–
FO85	box	1	–
FO91	box	1	–
FO92	box	1	–
FO93	box	1	–
FO96	box	1	–
FO102	box	1	–
NO–243	bulk (box)	50	50
SOD–18	box	450	450
SOD–53	bulk (bags)	1000	6000
SOD–57	reel	5000	5000
SOD–61	reel	5000	5000
SOD–63	bulk (bags)	1000	2000
SOD–64	reel	4000	4000
SOD–67	bulk	1000	2000
SOD–70	box	500	4000
SOD–74	bulk (bags)	1000	2000
SOD–75	bulk (bags)	1000	2000
SOD–76	bulk (bags)	1000	2000
SOD–77	bulk (bags)	1000	2000
SOD–78	bulk (bags)	1000	2000
SOD–79	bulk (bags)	1000	6000
SOD–80	blister tape	2500	2500
SOD–81	reel	5000	5000
SOD–82	bags	100	1000
SOD–83	reel	5000	5000
SOD–85	bulk (bags)	1000	2000
SOT–5	bulk (bags)	50	1000
SOT–18	bulk (bags)	500	4000
SOT–23	bulk (phials)	500	25000
	tape (reel)/box	3000	6000
SOT–32	bulk (bags)	50	1500
	rail	50	1000
SOT–37	bulk (bags)	500	8000
SOT–42	bulk (bags)	500	5000
SOT–48	tray/box	25	75
SOT–54	bulk (bags)	500	4000
	tape (reel)	1600	8000
	tape (ammo pack)	2000	10000
SOT–70	bags	100	2000
SOT–71	bags	100	2000
SOT–82	bulk (bags)	50	1000
	rail	50	1000
SOT–89	bulk (phials)	1000	10000
	tape (reel)	1000	1000
SOT–90	rail	75	1000
SOT–91	box	50	200
SOT–93	rail	25	500
SOT–103	bulk (bags)	500	5000
SOT–104	bulk (bags)	500	4000
SOT–112	box	200	200
SOT–115	bulk (tray)	1	50
SOT–122	tray/box	25	75
SOT–128	rail	50	1000
SOT–143	bulk (phials)	500	25000
	tape (reel)	3000	6000
SOT–148	box	20	120
SOT–173	bulk (box)	50	50
SOT–174	rail	75	1000
SOT–186	rail	50	1000
SOT–199	rail	25	500
TO–3	box	50	250
TO–18	bulk (bags)		
	transistors	500	4000
	LEDS	100	2000
TO–39	bulk (bags)	50	1000
TO–46	bulk (bags)	100	100
TO–48	box	10	100
TO–64	box	25	250
TO–65	box	5	50
TO–72	bulk (bags)	500	4000
TO–92	bulk (bags)	2000	2000
	tape (reel)	1600	8000
	tape (ammo pack)	2000	10000
TO–94	box	–	–
TO–126	bulk (bags)	50	1500
	rail	50	1000
TO–202	rail	50	1000
TO–220	rail	50	1000
TO–238	box	5	50
TO–240	box	1	10

Discrete semiconductors, CECC types

Products approved to the CECC (Cenelec Electronic Components Committee)
harmonized system for electronic components of assessed quality

type	CECC detail specification
BA314	CECC 50 001–026
BAT85	CECC 50 001–059
BAV18	CECC 50 001–022
BAV19	CECC 50 001–022
BAV20	CECC 50 001–022
BAV21	CECC 50 001–022
BAW62	CECC 50 001–021
BAX16	CECC 50 001–022
BAX17	CECC 50 001–022
BC107	CECC 50 002–076
BC108	CECC 50 002–077
BC109	CECC 50 002–078
BC140	CECC 50 002–004
BC141	CECC 50 002–005
BC160	CECC 50 002–015
BC161	CECC 50 002–016
BCY70	CECC 50 002–079
BCY71	CECC 50 002–080
BCY72	CECC 50 002–081
BFR90A	CECC 50 002–086
BFR91A	CECC 50 002–125
BFR96	CECC 50 002–126
BFX29	CECC 50 002–071
BFX30	CECC 50 004–083
BFX34	CECC 50 004–025
BFX37	CECC 50 002–185
BFX84	CECC 50 004–100
BFX85	CECC 50 004–100
BFX86	CECC 50 004–100
BFX87	CECC 50 002–071
BFX88	CECC 50 002–071
BFY50	CECC 50 002–089
BFY51	CECC 50 002–089
BFY52	CECC 50 002–089
BSS50	CECC 50 004–073
BSS51	CECC 50 004–073
BSS52	CECC 50 004–073
BSS60	CECC 50 004–074
BSS61	CECC 50 004–074
BSS62	CECC 50 004–074
BSV15	CECC 50 002–131
BSV16	CECC 50 002–131
BSV17	CECC 50 002–131
BSV64	CECC 50 004–008
BSV78	CECC 50 012–011
BSV79	CECC 50 012–011
BSV80	CECC 50 012–011
BSW66A	CECC 50 004–040
BSW67A	CECC 50 004–040
BSW68A	CECC 50 004–040
BSX45	CECC 50 002–174
BSX46	CECC 50 002–174
BSX47	CECC 50 002–174
BSX62	CECC 50 004–025
BSX63	CECC 50 004–025
BSX64	CECC 50 004–025
BT151–500R	CECC 50 011–003
BT151–650R	CECC 50 011–003
BT152–400	CECC 50 011–011
BT152–600	CECC 50 011–011
BT152–800	CECC 50 011–011
BT155–600	CECC 50 011–009
BT155–800	CECC 50 011–009
BTW38–600	CECC 50 011–006
BTW38–800	CECC 50 011–006
BTW38–1000	CECC 50 011–006
BTW38–1200	CECC 50 011–006
BTW42–600	CECC 50 011–006
BTW42–800	CECC 50 011–006
BTW42–1000	CECC 50 011–006
BTW42–1200	CECC 50 011–006
BTW45–200R	CECC 50 011–002
BTW45–400R	CECC 50 011–002
BTW45–600R	CECC 50 011–002
BTW45–800R	CECC 50 011–002
BTW45–1000R	CECC 50 011–002
BTW45–1200R	CECC 50 011–002
BTW63–600	CECC 50 011–010
BTW63–800	CECC 50 011–010
BTY79–100	CECC 50 011–006
BTY79–200	CECC 50 011–006
BTY79–300	CECC 50 011–006
BTY79–400	CECC 50 011–006
BTY79–500	CECC 50 011–006
BTY79–600	CECC 50 011–006
BTY79–800	CECC 50 011–006
BTY79–1000	CECC 50 011–006
BY229–200	CECC 50 009–021
BY229–400	CECC 50 009–021
BY229–600	CECC 50 009–021
BY229–800	CECC 50 009–021
BY229–1000	CECC 50 009–021
BYV20–30	CECC 50 009–033
BYV20–35	CECC 50 009–033
BYV20–40	CECC 50 009–033
BYV20–45	CECC 50 009–033
BYV21–30	CECC 50 009–018
BYV21–35	CECC 50 009–018
BYV21–40	CECC 50 009–018
BYV21–45	CECC 50 009–018
BYV22–30	CECC 50 009–034
BYV22–35	CECC 50 009–034
BYV22–40	CECC 50 009–034
BYV22–45	CECC 50 009–034
BYV23–30	CECC 50 009–036
BYV23–35	CECC 50 009–036

Discrete semiconductors, CECC types

Products approved to the CECC (Cenelec Electronic Components Committee) harmonized system for electronic components of assessed quality

type	CECC detail specification
BYV23–40	CECC 50 009–036
BYV23–45	CECC 50 009–036
BYV32–50(R)	CECC 50 009–026
BYV32–100(R)	CECC 50 009–026
BYV32–150(R)	CECC 50 009–026
BYV32–200(R)	CECC 50 009–026
BYW29–50	CECC 50 009–014
BYW29–100	CECC 50 009–014
BYW29–150	CECC 50 009–014
BYW29–200	CECC 50 009–014
BYW30–50	CECC 50 009–001
BYW30–100	CECC 50 009–001
BYW30–150	CECC 50 009–001
BYW30–200	CECC 50 009–001
BYW31–50	CECC 50 009–002
BYW31–100	CECC 50 009–002
BYW31–150	CECC 50 009–002
BYW31–200	CECC 50 009–002
BYW54	CECC 50 008–015
BYW55	CECC 50 008–015
BYW56	CECC 50 008–015
BYW92–50	CECC 50 009–003
BYW92–100	CECC 50 009–003
BYW92–150	CECC 50 009–003
BYW93–50	CECC 50 009–028
BYW93–100	CECC 50 009–028
BYW93–150	CECC 50 009–028
BYW93–200	CECC 50 009–028
BYX25–600(R)	CECC 50 009–022
BYX25–800(R)	CECC 50 009–022
BYX25–1000(R)	CECC 50 009–022
BYX25–1200(R)	CECC 50 009–022
BYX25–1400(R)	CECC 50 009–022
BYX38–300(R)	CECC 50 009–019
BYX38–600(R)	CECC 50 009–019
BYX38–900(R)	CECC 50 009–019
BYX38–1200(R)	CECC 50 009–019
BYX42–300(R)	CECC 50 009–020
BYX42–600(R)	CECC 50 009–020
BYX42–900(R)	CECC 50 009–020
BYX42–1200(R)	CECC 50 009–020
BYX49–300(R)	CECC 50 009–011
BYX49–600(R)	CECC 50 009–011
BYX49–1200(R)	CECC 50 009–011
BYX52–300(R)	CECC 50 009–024
BYX52–600(R)	CECC 50 009–024
BYX52–1200(R)	CECC 50 009–024
BYX56–600(R)	CECC 50 009–023
BYX56–800(R)	CECC 50 009–023
BYX56–1000(R)	CECC 50 009–023
BYX56–1200(R)	CECC 50 009–023
BYX56–1400(R)	CECC 50 009–023
BYX98–300(R)	CECC 50 009–004

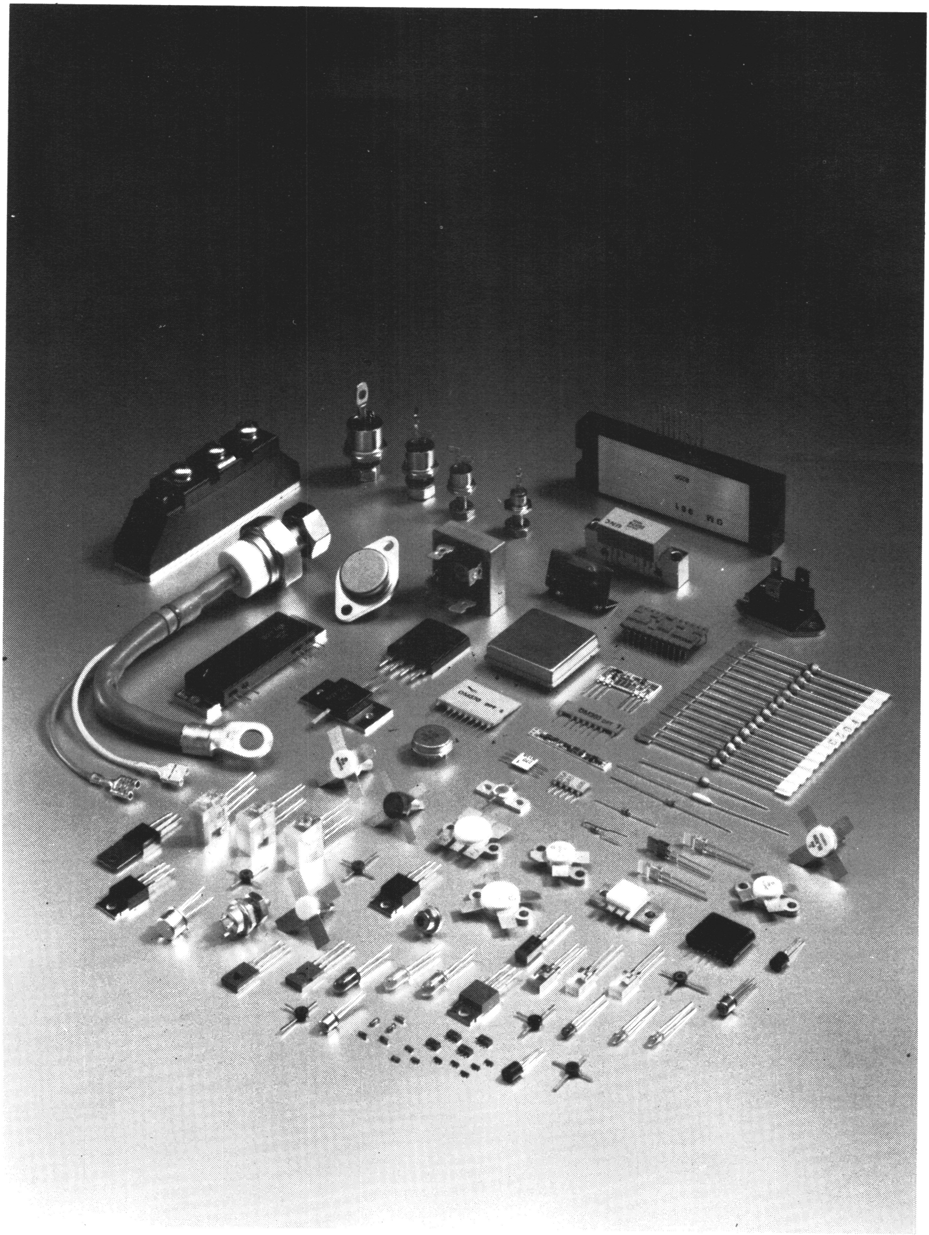
type	CECC detail specification
BYX98–600(R)	CECC 50 009–004
BYX98–900(R)	CECC 50 009–004
BYX98–1200(R)	CECC 50 009–004
BYX99–300(R)	CECC 50 009–005
BYX99–600(R)	CECC 50 009–005
BYX99–900(R)	CECC 50 009–005
BYX99–1200(R)	CECC 50 009–005
BZT03 C9V1–C270	CECC 50 005–017
BZV85 series	CECC 50 005–010
BZW03 series	CECC 50 005–019
BZW70 series	CECC 50 005–015
BZX55 C2V4–C75	CECC 50 005–005
BZX70 series	CECC 50 005–015
BZX79 C2V4–C75	CECC 50 005–005
BZY88 C2V4–C75	CECC 50 005–005
1N914	CECC 50 001–021
1N916	CECC 50 001–021
1N3879(R)	CECC 50 009–006
1N3880(R)	CECC 50 009–006
1N3881(R)	CECC 50 009–006
1N3882(R)	CECC 50 009–006
1N3883(R)	CECC 50 009–006
1N3890(R)	CECC 50 009–007
1N3891(R)	CECC 50 009–007
1N3892(R)	CECC 50 009–007
1N3899	CECC 50 009–035
1N3900	CECC 50 009–035
1N3901	CECC 50 009–035
1N3902	CECC 50 009–035
1N3903	CECC 50 009–035
1N3909	CECC 50 009–035
1N3910	CECC 50 009–035
1N3911	CECC 50 009–035
1N3912	CECC 50 009–035
1N3913	CECC 50 009–035
1N4148	CECC 50 001–021
1N4149	CECC 50 001–021
1N4446	CECC 50 001–021
1N4447	CECC 50 001–021
1N4448	CECC 50 001–021
1N4449	CECC 50 001–021
1N5059	CECC 50 008–015
1N5060	CECC 50 008–015
1N5061	CECC 50 008–015
1N5062	CECC 50 008–015
2N1613	CECC 50 002–104
2N1711	CECC 50 002–104
2N1893	CECC 50 002–104
2N2218(A)	CECC 50 004–029
2N2219(A)	CECC 50 004–029
2N2222(A)	CECC 50 004–030
2N2904(A)	CECC 50 002–102
2N2905(A)	CECC 50 002–102

Discrete semiconductors, CECC types

Products approved to the CECC (Cenelec Electronic Components Committee) harmonized system for electronic components of assessed quality

type	CECC detail specification
2N2906(A)	CECC 50 002–103
2N2907(A)	CECC 50 002–103
2N3019	CECC 50 002–175
2N3020	CECC 50 002–175
CV7099	CECC 50 005–005
CV7100	CECC 50 005–005
CV7101	CECC 50 005–005
CV7102	CECC 50 005–005
CV7103	CECC 50 005–005
CV7104	CECC 50 005–005
CV7105	CECC 50 005–005
CV7106	CECC 50 005–005
CV7138	CECC 50 005–005
CV7139	CECC 50 005–005
CV7140	CECC 50 005–005
CV7141	CECC 50 005–005
CV7142	CECC 50 005–005
CV7143	CECC 50 005–005
CV7144	CECC 50 005–005
CV7145	CECC 50 005–005
CV7146	CECC 50 005–005
CV7311	CECC 50 009–019
CV7312	CECC 50 009–019
CV7313	CECC 50 009–019
CV7314	CECC 50 009–019
CV7315	CECC 50 009–019
CV7316	CECC 50 009–019
CV7317	CECC 50 009–019
CV7318	CECC 50 009–019
CV7319	CECC 50 009–019
CV7320	CECC 50 009–019
CV7367	CECC 50 001–021
CV7368	CECC 50 001–021
CV7379	CECC 50 009–020
CV7380	CECC 50 009–020
CV7381	CECC 50 009–020
CV7382	CECC 50 009–020
CV7384	CECC 50 009–020
CV7385	CECC 50 009–020
CV7386	CECC 50 009–020
CV7387	CECC 50 009–020
CV7669	CECC 50 002–132
CV7670	CECC 50 002–132
CV7671	CECC 50 002–132
CV7672	CECC 50 002–132
CV7673	CECC 50 002–133
CV7674	CECC 50 002–133
CV7375	CECC 50 002–133
CV7376	CECC 50 002–133
CV7722	CECC 50 002–177
CV7723	CECC 50 002–177
CV7724	CECC 50 002–177
CV7725	CECC 50 004–096

type	CECC detail specification
CV7726	CECC 50 004–096
CV7727	CECC 50 004–096
CV7756	CECC 50 001–021
CV7757	CECC 50 001–021
CV7768	CECC 50 004–094
CV7770	CECC 50 004–094
CV7875	CECC 50 001–038
CV8308	CECC 50 001–020
CV8308–ID	CECC 50 001–020
CV8617	CECC 50 001–021
CV8790	CECC 50 001–022
CV8805	CECC 50 001–020
CV8805–ID	CECC 50 001–020
CV9507	CECC 50 004–050
CV9637	CECC 50 001–021
CV9638	CECC 50 001–037
CV9790	CECC 50 002–168
CV10253	CECC 50 004–095
CV10254	CECC 50 002–176
CV10440	CECC 50 004–087
CV10806	CECC 50 002–165
CV10807	CECC 50 004–085
CV10814	CECC 50 002–141
CV12253	CECC 50 004–095
CVA7026	CECC 50 008–015
CVA7027	CECC 50 008–015
CVA7028	CECC 50 008–015
CVA7029	CECC 50 008–015
CVA7030	CECC 50 008–015
CVA7476	CECC 50 008–015
PO15	CECC 50 004–084
PO17	CECC 50 004–085
PO33	CECC 50 001–026



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PHILIPS

Notes

Notes

Electron tubes

E

Data Handbook System

On most pages, directly underneath the title, reference is made to a 'Data Handbook'. That Handbook is part of Philips Data Handbook System which is a comprehensive source of information on electronic components, subassemblies and materials. For this catalogue section the following Handbooks are of interest:

book	title
T3	Klystrons
T5	Cathode–ray tubes
T6	Geiger–Müller tubes
T8 (DC01)	Colour display systems
T9	Photo and electron multipliers
T10	Plumbicon camera tubes and accessories
T11	Microwave diodesand sub–assemblies
T12	Vidicon and Newvicon camera tubes and deflection units
T13	Image intensifiers and infrared detectors
T16	Monochrome tubes and deflection units

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Flat, square monochrome data graphic display tubes E16
Monochrome data graphics: screen phosphors E17
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CRTs for special applications E21
Survey of screen phosphors E22

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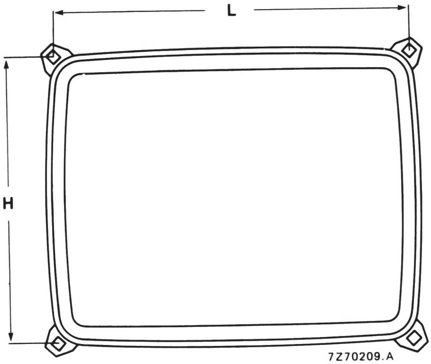
Colour TV picture tubes

For detailed information on these and other types see Data Handbook DC01

- high brightness
- pigmented phosphors
- self–converging
- in–line guns
- no N–S correction



TUBE DATA

tube type	tube size inch.	defl. angle deg.	neck dia–meter mm	useful screen diag. min mm	over–all length max mm	JEDEC base
A34EAC00X.. **A34EAC01X..**	14 14	90 90	22.5 22.5	335 335	339 339	B8–288 B8–288
A37–573X0510	14	90	29.1	335.4	342.4	B12–262
A37–590X.... **A37–591X....**	14 14	90 90	29.1 29.1	335.4 335.4	347.1 351.5	B10–277 B8–274
A37–598X.... **A37–599X....**	14 14	90 90	29.1 29.1	335.4 335.4	347.1 347.1	B10–277 B10–277

Colour TV picture tubes

For detailed information on these and other types see Data Handbook DC01

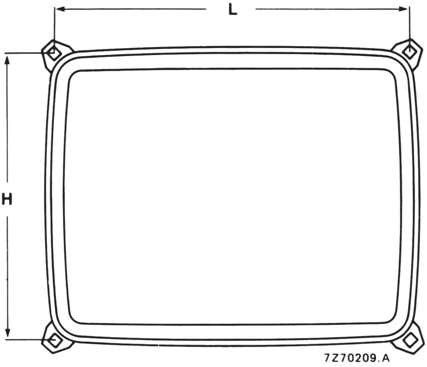
TUBE DATA (cont.)							AVAILABLE ASSEMBLIES*
	typical operating conditions					V_a/ I_a m ax kV/mA	
tube type	V_f/I_f V/mA	V_a kV	V_{g3} %V_a	V_{g2} V	$V_{c.off}$ V		
A34EAC00X..	6.3/300	23	28	310–600	120	27.5/1	**A34EAC..X02**
A34EAC01X..	6.3/300	23	28	310–600	120	27.5/1	**A34EAC..X03**
							A34EAC..X04
							A34EAC..X05
							A34EAC..X06
							A34EAC..X10
							A34EAC..X12
							A34EAC..X17
							A34EAC..X70
A37–573X0510	6.3/685	25	20	350–625	130	27.5/1	**A37–573X0510**
A37–590X....	6.3/685	25	28	420–830	150	27.5/1	**A37–59.X0620**
A37–591X....	6.3/685	25	28	420–830	150	27.5/1	**A37–59.X0621**
A37–598X....	6.3/685	25	28	420–830	150	27.5/1	**A37–59.X0620**
A37–599X....	6.3/685	25	28	420–830	150	27.5/1	

* assemblies are available for all tubes when grouped together

Colour TV picture tubes (cont.)

For detailed information on these and other types see Data Handbook DC01

- high brightness
- pigmented phosphors
- self–converging
- in–line guns
- no N–S correction



TUBE DATA

tube type	tube size inch.	defl. angle deg.	neck dia–meter mm	useful screen diag. min mm	over–all length max mm	JEDEC base
A38EZC00X.. **A38EZC01X..**	16 16	90 90	22.5 22.5	382 382	371 371	B8–288 B8–288
A42–570X1500	16	90	29.1	382.3	373.4	B12–262
A42–592X.... **A42–593X....**	16 16	90 90	29.1 29.1	382.3 382.3	378.6 383	B10–277 B10–277
A48EAC00X.. **A48EAC02X..**	20 20	90 90	22.5 22.5	480 480	432 432	B8–288 B8–288
A51–570X....	20	90	29.1	480	429	B12–262
A51–590X.... **A51–590X....**	20 20	90 90	29.1 29.1	480 480	436.4 441	B10–277 B10–277

For detailed information on these and other types see Data Handbook DC01

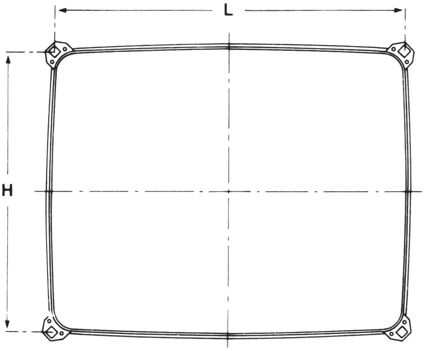
TUBE DATA (cont.)							AVAILABLE ASSEMBLIES*
	typical operating conditions					V_a/ I_a max	
tube type	V_f/I_f V/mA	V_a kV	V_{g3} %V_a	V_{g2} V	$V_{c.off}$ V	kV/mA	
A38EZC00X.. **A38EZC01X..**	6.3/300 6.3/300	23 23	28 28	310–600 310–600	120 120	27.5/1 27.5/1	**A38EAC..X01** **A38EAC..X03** **A38EAC..X04** **A38EAC..X05** **A38EAC..X10**
A42–570X1500	6.3/685	25	20	310–560	120	27.5/1	**A42–570X1500**
A42–592X.... **A42–593X....**	6.3/685 6.3/685	25 25	28 28	420–830 420–830	150 150	27.5/1 27.5/1	**A42–59.X1620** **A42–59.X1625** **A42–59.X7021** **A42–59.X7025**
A48EAC00X.. **A48EAC02X..**	6.3/300 6.3/300	25 25	31 31	310–650 310–650	120 120	27.5/1.5 27.5/1.5	**A48EAC..X01** **A48EAC..X03** **A48EAC..X04**
A51–570X....	6.3/685	25	20	310–560	120	27.5/1.5	**A51–570X3750** **A51–570X3801** **A51–570X3810** **A51–570X3840** **A51–570X3850**
A51–590X.... **A51–590X....**	6.3/685 6.3/685	25 25	28 28	420–830 420–830	150 150	27.5/1.5 27.5/1.5	**A51–59.X3620** **A51–59.X3623** **A51–59.X3625** **A51–59.X3930** **A51–59.X8020**

* assemblies are available for all tubes when grouped together

Flat, square colour TV picture tube assemblies

For detailed information on these and other types see Data Handbook DC01

- flat and square screen
- factory preset tube/coil assemblies
- self-converging and raster correction free
- high brightness
- pigmented phosphors



TUBE DATA

tube type	tube size cm	defl. angle deg.	neck dia-meter mm	useful screen diag. min mm	over-all length max mm	JEDEC base
A36EAM00X..	36	90	22.5	356	345	B8–288
A36EAM01X..	36	90	22.5	356	345	B8–288
A41EAM00X..	41	90	22.5	406	374	B8–288
A41EAM01X..	41	90	22.5	406	374	B8–288
A51EAM30X..	51	90	22.5	508	453	B8–288
A51EAM31X..	51	90	22.5	508	435	B8–288
A51EAL00X..	51	90	29.1	508	448.7	B10–277
A51EAL10X..	51	90	29.1	508	453.3	B8–274
A51EAL11X..	51	90	29.1	508	453.3	B8–274
A51EAL20X..	51	90	29.1	508	448.7	B10–277
A51EAL30X..	51	90	29.1	508	448.7	B10–277
A51EAL40X..	51	90	29.1	508	448.7	B10–277
A51EAL50X..	51	90	29.1	508	448.7	B10–277
A51EAL60X..	51	90	29.1	508	448.7	B10–277

Flat, square colour TV picture tube assemblies

For detailed information on these and other types see Data Handbook DC01

- flat and square screen
- factory preset tube/coil assemblies
- self–converging and raster correction free
- high brightness
- pigmented phosphors

TUBE DATA (cont.)							AVAILABLE ASSEMBLIES*
	typical operating conditions						
tube type	V_f/I_f V/mA	V_a kV	V_{g3} %V_a	V_{g2} V	$V_{c.off}$ V	V_a/I_a m ax kV/mA	
A36EAM00X..	6.3/300	23	31	310–650	120	27.5/1	**A36EAM..X01**
A36EAM01X..	6.3/300	23	31	310–650	120	27.5/1	**A36EAM..X03**
							A36EAM..X04
							A36EAM..X16
A41EAM00X..	6.3/300	23	31	310–650	120	27.5/1	**A41EAM..X01**
A41EAM01X..	6.3/300	23	31	310–650	120	27.5/1	**A41EAM..X03**
							A41EAM..X04
							A41EAM..X16
A51EAM30X..	6.3/300	25	31	310–650	120	27.5/1.5	**A51EAM..X01**
A51EAM31X..	6.3/300	25	31	310–650	120	27.5/1.5	**A51EAM..X16**
A51EAL00X..	6.3/310	25	31	575–825	130	27.5/1.5	**A51EAL..X01**
A51EAL10X..	6.3/310	25	31	575–825	130	27.5/1.5	**A51EAL..X02**
A51EAL11X..	6.3/310	25	31	575–825	130	27.5/1.5	**A51EAL..X03**
A51EAL20X..	6.3/310	25	31	575–825	130	27.5/1.5	**A51EAL..X05**
A51EAL30X..	6.3/310	25	31	575–825	130	27.5/1.5	**A51EAL..X11**
A51EAL40X..	6.3/310	25	31	575–825	130	27.5/1.5	**A51EAL..X30**
A51EAL50X..	6.3/310	25	31	575–825	130	27.5/1.5	
A51EAL60X..	6.3/310	25	31	575–825	130	27.5/1.5	

* assemblies are available for all tubes when grouped together

Flat, square colour TV picture tube assemblies (cont.)

For detailed information on these and other types see Data Handbook DC01

TUBE DATA

tube type	TV lines	defl. angle deg.	useful screen diag. min mm	over-all length max mm	remarks	
A51EAK01X..	625	110	508	368	invar mask	
M78JUA98X..	525/625	110	784	498		
A78EBK03X..	525/625	110	784	498		

Flat, square colour TV picture tube assemblies (cont.)

For detailed information on these and other types see Data Handbook DC01

TUBE DATA (cont.)

tube type	typical operating conditions					V_a/ I_a m ax kV/mA	AVAILABLE ASSEMBLIES*
	V_f/I_f V/mA	V_a kV	V_{g3} %V_a	V_{g2} V	$V_{c.off}$ V		
A51EAK01X..	6.3/310	25	31	575–825	130	27.5/1.5	**A51EAK..X01** **A51EAK..X02** **A51EAK..X03** **A51EAK..X04** **A51EAK..X05**
M78JUA98X..	6.3/630	27.5	27.2	425–885	160	29.9/1.5	**M78JUA98X01** **M78JUA98X32**
A78EBK03X..	6.3/575	27.5	27.2	780–1200	160	29.9/1.8	**A78EBK03X01** **A78EBK03X32**

* assemblies are available for all tubes when grouped together
all tubes listed in the above table have a neck diameter of 29.1 mm and a JEDEC base B10–277

For detailed information on these and other types see Data Handbook DC01

ASSEMBLY	COIL TYPE	DEFLECTION COIL DATA						REMARKS
		line coil			field coil			
		induct-ance mH	resist-ance Ω	current A(p–p)	induct-ance mH	resist-ance Ω	current A(p–p)	
A34EAC..X02	**AT1625/10**	2.43	3.3	2.17	110	54	0.375	incl. loss coil, 0.15 mH
A34EAC..X03	**AT1625/20**	2.47	3.3	2.17	27.5	14	0.750	incl. loss coil, 0.15 mH
A34EAC..X04	**AT1625/30**	2.50	3.3	2.07	110	54	0.375	
A34EAC..X05	**AT1625/21**	2.28	3.2	2.17	27.5	14	0.750	
A34EAC..X06	**AT1625/31**	2.50	3.3	2.07	27.5	14	0.750	
A34EAC..X10	**AT1625/22**	2.53	3.3	2.17	27.5	14	0.750	incl. loss coil, 0.25 mH
A34EAC..X12	**AT1625/41**	2.74	3.9	1.98	27.5	14	0.750	
A34EAC..X17	**AT1625/32**	2.65	3.4	2.07	27.5	14	0.750	incl. loss coil, 0.15 mH
A34EAC..X70	**AT1625/70**	1.64	2.1	2.56	110	54	0.375	WTB–2 connectors
A37–573X0510	**AT1205/10**	1.85	2.0	3.00	109	50	0.420	
A37–59.X0620	**AT1206/20**	1.78	1.8	3.21	29.1	11	0.970	
A37–59.X0621	**AT1206/21**	1.78	1.8	3.19	29.1	11	0.970	
A38EAC..X01	**AT1635/00**	2.50	3.3	2.07	27.5	12	0.780	
A38EAC..X03	**AT1635/20**	2.50	3.3	2.22	27.5	12	0.780	incl. loss coil, 0.31 mH
A38EAC..X04	**AT1635/30**	2.50	3.3	2.07	100	47	0.390	
A38EAC..X05	**AT1635/21**	2.19	3.1	2.22	27.5	12	0.780	
A38EAC..X10	**AT1635/22**	2.54	12	2.22	27.5	12	0.780	incl. loss coil, 0.15 mH
A42–570X1500	**AT1215/00**	2.30	2.2	2.75	23.0	12	0.870	
A42–59.X1620	**AT1216/20**	1.73	1.8	3.28	29.1	11	0.940	RC network across line coils 680 Ω/680 pF
A42–59.X1625	**AT1216/25**	1.73	1.8	3.28	116.4	44	0.470	
A42–59.X7020	**AT1470/21**	1.89	2.6	3.04	29.5	14	0.900	
A42–59.X7025	**AT1470/25**	1.89	2.6	3.04	116	56	0.450	
A48EAC..X01	**AT1645/00**	2.50	3.3	2.23	27.5	12	0.806	
A48EAC..X03	**AT1645/20**	2.34	3.2	2.38	27.5	12	0.806	incl. loss coil, 0.15 mH
A48EAC..X04	**AT1645/00**	2.50	3.3	2.23	110	47	0.403	

Colour picture tubes and deflection units (cont.)

For detailed information on these and other types see Data Handbook DC01

ASSEMBLY	COIL TYPE	DEFLECTION COIL DATA						REMARKS
		line coil			field coil			
		inductance mH	resistance Ω	current A(p–p)	inductance mH	resistance Ω	current A(p–p)	
A51–570X3750	**AT1237/50**	1.66	1.9	3.25	114	60	0.400	
A51–570X3801	**AT1238/01**	2.30	2.2	2.75	22.0	12	0.900	
A51–570X3810	**AT1238/10**	1.76	1.9	3.15	24.0	12	0.880	
A51–570X3840	**AT1238/40**	1.66	1.9	3.25	28.5	15	0.800	
A51–570X3850	**AT1238/50**	1.66	1.7	3.25	114	60	0.400	
A51–59.X3620	**AT1236/20**	1.88	1.9	3.04	27.6	13	0.895	
A51–59.X3623	**AT1236/23**	2.07	2.1	3.04	27.6	13	0.895	incl. loss coil, 0.19 mH
A51–59.X3625	**AT1236/25**	1.88	1.9	3.04	110.4	53	0.477	
A51–59.X3930	**AT1239/30**	1.70	1.8	3.23	29.0	14	0.865	RC network accross line coils 680 Ω/680 pF
A51–59.X8020	**AT1480/20**	1.90	2.2	3.10	29.0	14	0.860	
A36EAM..X01	**AT6060/00**	2.43	3.2	2.10	26.2	12	0.820	
A36EAM..X03	**AT6060/03**	2.43	3.2	2.10	26.2	12	0.820	WTB–2 connectors
A36EAM..X04	**AT6060/30**	2.43	3.2	2.10	108	50	0.470	
A36EAM..X16	**AT6060/42**	1.64	2.2	2.56	108	50	0.470	WTB–2 connectors
A41EAM..X01	**AT6050/00**	2.43	3.2	2.10	26.2	12	0.820	
A41EAM..X03	**AT6050/03**	2.43	3.2	2.10	26.2	12	0.820	WTB–2 connectors
A41EAM..X04	**AT6050/30**	2.43	3.2	2.10	108	50	0.470	
A41EAM..X16	**AT6050/42**	1.64	2.2	2.56	108	50	0.470	WTB–2 connectors
A51EAM..X01	**AT6040/00**	2.37	3.2	2.26	22.5	11	0.950	
A51EAM..X16	**AT6040/42**	1.64	2.3	2.71	108	50	0.430	WTB–2 connectors
A51EAL..X01	**AT6035/04**	2.00	2.3	2.85	19.5	9.7	1.09	WTB–2 connectors
A51EAL..X02	**AT6035/02**	2.00	2.3	2.85	19.5	9.7	1.09	6 pin connector
A51EAL..X03	**AT6035/03**	2.00	2.3	2.85	19.5	9.7	1.09	WTB–2 connectors
A51EAL..X05	**AT6035/05**	1.13	1.4	3.78	78.0	40	0.540	WTB–2 connectors
A51EAL..X11	**AT6035/11**	1.70	2.0	3.09	19.5	9.7	1.090	6 pin connector
A51EAL..X30	**AT6035/30**	2.00	2.3	2.85	78.0	40	0.540	6 pin connector
A51EAK01X01	**AT6020/00**	2.03	2.0	3.88	11.7	6.0	1.77	6 pin connector
A51EAK01X02	**AT6020/00**	2.03	2.0	3.88	11.7	6.0	1.77	6 pin connector in south
A51EAK01X03	**AT6020/10**	2.03	2.0	3.88	11.7	6.0	1.77	WTB–2 connector
A51EAK01X04	**AT6020/15**	2.03	2.0	3.90	107	51	0.590	6 pin connector
A51EAK01X05	**AT6020/20**	1.84	1.9	4.04	11.8	5.9	1.750	6 pin connector
M78JUA98X01	**KY7496M1**	1.50	2.1	4.90	12.8	6.4	1.71	
M78JUA98X32	**KY749632**	0.350	0.54	10.2	7.50	3.4	2.24	
A78EBK03X01	**KY7496M1**	1.50	2.1	4.90	12.8	6.4	1.71	
A78EBK03X32	**KY749632**	0.350	0.54	10.2	7.50	3.4	2.24	

Colour data graphic display tube assemblies

For detailed information on these and other types see Data Handbook DC01

For all types:
neck diameter = 29.1 mm
cut–off voltage = typ. 100 V
grid 2 voltage = 270 to 570 V

High resolution colour display tube assemblies for Data Graphic Displays

screen diag. inch	type	defl. angle deg.	JEDEC base	dot triplet pitch mm	min number of displayable pixels	anode voltage typ kV	focusing voltage typ kV	light transmission at screen centre (%)
10	**M25–100X/N/4100**	76	B10–277	0.28	576 x 480	22	5.3	55
12	**M29JAL00X**	90	B10–277	0.31	720 x 580	23	5.5	85.5
12	**M29JAL70X**	90	B10–277	0.31	720 x 580	23	5.5	44
14	**M37–103X/N/1100**	90	B10–277	0.29	800 x 600	25	7.0	85
14	**M37–108X/N/1100**	90	B10–277	0.29	800 x 600	25	7.0	57
14	**M37–118X/N/1100**	90	B11–277	0.29	800 x 600	25	7.0	46
16	**M42–106X/N/6100**	90	B10–277	0.31	820 x 670	25	6.0	45
20	**M51–107X/N/7100**	90	B10–277	0.32	860 x 670	25	6.0	40

Monochrome data graphic display tubes

For detailed information on these and other types see Data Handbook T16

- various phosphors
- anti–reflective treatments
- various glass transmissions
- appropriate wound components

type	L x H (fig.2) mm
9 inch	212 x 160
12 inch	273.3 x 190.2
14 inch	290.3 x 231.7
15 inch	311.4 x 244.5
17 inch	363.5 x 288.5
20 inch	414 x 331

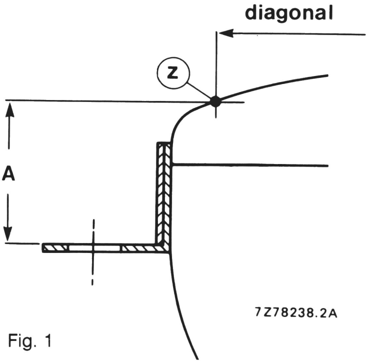


Fig. 1

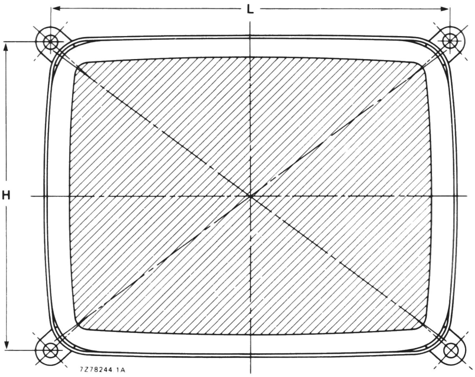


Fig. 2

screen diag. inch	type	defl. angle deg.	useful screen diag. min mm	overall length max mm	screen curva–ture radius mm	neck dia–meter mm	typical operating conditions					lug position A (Fig.1) mm
							V_f/I_f V/mA	V_{g2} V	V_{g4} V	V_a kV	V_{KR} V	
9	**M24–306**	90	222.5	227	690	20	12/130	400	0–300	12	30–60	27.5
12	**M31–326**	110	295	241	635	28.6	6.3/240	400	0–400	17	40–70	25.3
12	**M31–336**	90	292	280	510	20	12/130	400	0–300	12	30–60	28.5
12	**M31–340**	90	295	277	635	20	12/130	400	0–300	12	30–60	25.3
14	**M32EAA**	90	322	287	770	20	12/130	400	0–300	14	30–60	28.5
15	**MK38–328**	110	352	279	635	28.6	6.3/240	400	0–400	17	40–70	25.4
17	**M41EAA0**	114	413	291	700	28.6	6.3/240	400	0–400	20	40–70	28.0
20	**M47EAA0**	114	473	319	941	28.6	6.3/240	400	0–400	20	40–70	31.0

Flat, square monochrome data graphic display tubes

For detailed information on these and other types see Data Handbook T16

- various phosphors
- anti–reflective treatments
- various glass transmissions
- appropriate wound components

type	L x H (fig.2) mm
12 inch	273.3 x 190.2
14 inch	290.3 x 231.7
15 inch	326.4 x 261.0

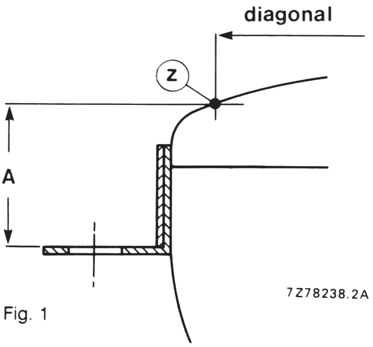


Fig. 1

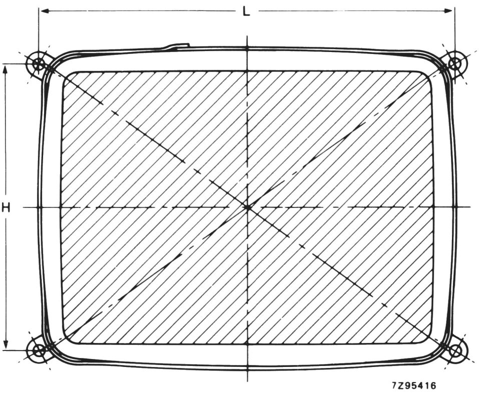


Fig. 2

screen diag. inch	type	defl. angle deg.	useful screen diag. min mm	overall length max mm	screen curvature radius mm	neck diameter mm	typical operating conditions V_f/I_f V/mA	V_{g2} V	V_{g4} V	V_a kV	V_{KR} V	lug position A (Fig.1) mm
12	**M29EAA**	90	294	275	1200	20	12/130	400	0–300	12	30–60	–
12	**M29EAB**	90	294	275	1200	20	12/130	400	0–300	12	30–60	27.6
12	**M29ECA**	90	294	275	1200	20	12/75	400	0–300	12	30–60	–
12	**M29ECB**	90	294	275	1200	20	12/75	400	0–300	12	30–60	27.6
14	**M32EBL**	90	320	282	1520	20	12/130	400	0–300	14	32–64	28
14	**M32EBM**	90	320	282	1520	20	12/75	400	0–300	14	32–64	–
14	**M32EBN**	90	320	282	1520	20	12/75	400	0–300	14	32–64	28
15	**M36EAB**	110	363	276	1200	28.6	6.3/240	400	0–400	17	40–70	34

Monochrome data graphics: screen phosphors

For detailed information on these and other types see Data Handbook T16

Survey of screen phosphors

type	design-ation	fluorescent colour	phosphorescent colour	persistance*	colour co-ordinates		relative brightness (%) with respect to type W
					x	Y	
W (WW)	P4	white	white	medium short	0.265	0.295	100
WS	P104	white	white	medium short	0.285	0.320	approx. 110
WJ	P115	white	white	medium short	0.315	0.355	approx. 120
WR	–	white	white	medium short	0.355	0.395	approx. 130
WD	–	white	white	medium	0.355	0.395	approx. 65
GH	P31	green	green	medium short	0.265	0.550	approx. 150
GR	P39	yellowish-green	yellowish-green	long	0.205	0.715	approx. 75
GW	P42	yellowish-green	yellowish green	medium	0.238	0.568	approx. 120
HA	–	yellowish-green	yellowish-green	medium	0.220	0.660	approx. 85
KC	–	yellow-green	yellow-green	medium short	0.425	0.550	approx. 170
LA	–	orange	orange	medium	0.557	0.442	approx. 60
LM	–	orange	orange	medium short	0.547	0.446	approx. 85

Monochrome data graphics: deflection units

For detailed information on these and other types see Data Handbook T16

			line coil		field coil	
type	defl. angle deg	tube neck dia mm	inductance µH	resistance Ω	inductance mH	resistance Ω
AT1037/01	110	20	72	0.15	12.2	13.5
AT1037/11	110	20	105.6	0.21	5.04	5.7
AT1039/00	110	15	228	0.39	9.18	10.2
AT1039/01	110	15	206	0.38	9.6	10.5
AT1039/03	110	12	228	0.41	9.18	10.2
AT1039/05	110	15	107.5	0.18	9.5	10.4
AT1039/08	110	20	230	0.39	9.3	10.4
AT1039/09	110	20	213	0.37	9.5	10.5
AT1039/20	110	15	233	0.38	8.8	10
AT1039/21	110	15	205	0.35	9.5	10.4
AT1039/39	110	20	111	0.18	9.5	10.4
AT1078/02	90	12	480	0.9	18	11
AT1078/02P	90	12	480	0.9	18	11
AT1078/03P	90	12	480	0.9	72	40
AT1078/04	90	14	310	0.66	23.8	13.6
AT1078/06	90	12	190	0.4	7	4.5
AT1078/08	90	12	480	0.89	6.93	4.24
AT1078/09P	90	9	480	0.9	18	11
AT1078/10	90	12	310	0.66	23.8	13.6
AT1078/11	90	14	320	0.62	23.8	13
AT1078/12P	90	12	80	0.16	25	13
AT1078/14	90	14	242	0.51	48	36
AT1078/15	90	14	100	0.215	10	5.9
AT1078/16	90	12	120	0.225	18	11
AT1078/16P	90	12	120	0.23	18	11
AT1078/17P	90	14	120	0.23	18	11
AT1078/18	90	12	247	0.53	27.2	16.6
AT1078/19	90	12	247	0.53	6.85	4.1
AT1078/19P	90	12	245	0.53	6.85	4.1
AT1078/20	90	9	247	0.53	6.85	4.1
AT1078/21	90	12	247	0.53	6.85	4.1
AT1078/22	90	14	100	0.18	12	8.7
AT1078/30P	90	14	480	0.9	9.8	5.1
AT1078/35P	90	14	470	0.97	19	9.9
AT1078/36P	90	14	117	0.24	19	9.9
AT1078/37P	90	14	117	0.24	19	9.9
AT1078/38P	90	14	470	0.97	19	9.9

Monochrome data graphics: deflection units (cont.)

For detailed information on these and other types see Data Handbook T16

	sensitivity					
		scan current		scan		
type	at EHT kV	line A(p–p)	field A(p–p)	H mm	V mm	tube size inch
AT1037/01	17.5	13.1	0.87	348	261	20
AT1037/11	17	10.73	1.33	348	261	20
AT1039/00	17	5.6	1.15	194	259	15
AT1039/01	17	7.55	0.9	259	194	15
AT1039/03	17	7.34	1.02	230	170	12
AT1039/05	17	10.5	0.95	257	194	15
AT1039/08	20	6.27	1.39	261	348	20
AT1039/09	20	8.16	1.08	348	261	20
AT1039/20	17	5.66	1.32	200	267	15
AT1039/21	17	7.64	0.95	267	200	15
AT1039/39	17.5	11	1.04	348	261	20
AT1078/02	12	2.5	0.46	216	162	12
AT1078/02P	12	2.5	0.45	216	162	12
AT1078/03P	12	2.6	0.22	216	162	12
AT1078/04	14	3.36	0.44	237	178	14
AT1078/06	12	3.94	0.74	216	162	12
AT1078/08	12	2.63	0.78	216	162	12
AT1078/09P	12	2.6	0.47	168	126	9
AT1078/10	12	3.05	0.39	216	162	12
AT1078/11	14	3.3	0.46	237	178	14
AT1078/12P	12	6.2	0.38	216	162	12
AT1078/14	14	3.72	0.31	237	178	14
AT1078/15	14	5.93	0.72	237	178	14
AT1078/16	12	5	0.45	216	162	12
AT1078/16P	12			216	162	12
AT1078/17P	14			237	178	14
AT1078/18	12	2.24	0.37	216	162	12
AT1078/19	12	3.5	0.73	216	162	12
AT1078/19P	12	3.5	0.73	216	162	12
AT1078/20	12	3.6	0.77	168	126	9
AT1078/21	12	3.5	0.73	216	162	12
AT1078/22	14			237	178	14
AT1078/30P	14	2.86	0.69	237	178	14
AT1078/35P	12	2.88	0.48	237	178	14
AT1078/36P	14	5.75	0,49	237	178	14
AT1078/37P	14	5.75	0.49	237	178	14
AT1078/38P	12	2.88	0.49	237	178	14

For detailed information on these and other types see Data Handbook T5

Instrument tubes

- All types in rectangular bulb with flat face
- Internal graticule is standard for most types
- Internal magnetic correction for orthogonality, astigmatism and eccentricity
- All higher bandwidth tubes with advanced domed mesh post deflection acceleration
- Types listed are available with GH or GY phosphor (GY phosphor recommended for monoaccelerator tubes, GH phosphor for post–deflection accelerator tubes)
- Quick–heating cathode 6,3 V/240 mA or 6,3 V/100 mA

type	min useful scan mm	acceleration voltage		deflection coefficient		max overall length mm	heater V/mA	max bandwidth MHz
		first kV	final kV	hor. V/cm	vert. V/cm			
D7–221GY	60 x 36	1	–	12.5	20	225	6.3/100	10
D7–222GY	60 x 36	1	–	12.5	20	225	6.3/240	10
D10–180GY	70 x 56	2	–	36	23	240	6.3/240	25
D10–181GY	70 x 56	2	–	36	23	240	6.3/100	25
D12–130GY/119	80 x 64	2	–	32	21	257	6.3/100	25
D12–150GH/119	80 x 64	2.2	16.5	8.3	4.3	299	6.3/100	100
D12–160GY/119	80 x 64	2	–	23.8	13.8	292	6.3/100	25
D14–363GY/123	100 x 80	2	–	19	11.5	333	6.3/100	25
D14–364GY/123	100 x 80	2	–	19	11.5	333	6.3/240	25
D14–371GH/123	100 x 80	2.2	16.5	8.3	4	338	6.3/100	100
D14–372GH/123	100 x 80	2.2	16.5	8.3	4	338	6.3/240	100
D14–381GH/123	100 x 80	2.2	16.5	8.3	4	338	6.3/100	200
D14–382GH/123	100 x 80	2.2	16.5	8.3	4	338	6.3/240	200
D14–400GH/123	100 x 80	3	24	7.3	2.9	419	6.3/240	500
D18–180GY/127	120 x 96	2	–	21	15	324	6.3/100	25
D19–190GY/127	120 x 96	2	16	6.4	3.4	348	6.3/240	100

CRTs for special applications

For detailed information on these and other types see Data Handbook T5

Special monitor and data display tubes

nom screen diag. cm	type number	min useful screen diag. mm	defl. angle °	max overall length mm	neck dia mm	scr. curv. rad. mm	typ oper. cond.			cathode cut off V	V_a kV	resolutiom (shrinking raster/ TV lines)
							V_f V	I_f mA	V_{g2} V			
17 (7 inch)	**M17–142WE**	155	70	234	28	flat	6.3	240	400	30–60	14	1050/
	M17–144WE[1]	155	70	234	28	flat	6.3	240	400	30–60	14	1050/
	M17–143WE[2]	155	70	240	28	flat	6.3	240	600	40–90	16	1250/
	M17–145WE[1+2]	155	70	240	28	flat	6.3	240	600	40–90	16	1250/
	M17–220WE[1]	155	70	269	28	flat	6.3	240	800	50–80	15	1800/2500
	M17–230WE	155	70	257	28	flat	6.3	240	400	60–110	15	1500/2500
24 (9 inch)	**M24–100W**	225	90	260	28	690	6.3	300	600	32–85	16	900/1500
	M24–101W	225	90	260	28	690	6.3	300	600	32–85	16	900/1500
31 (12 inch)	**M31–130W**	295	90	310	28	635	6.3	300	600	32–85	16	900/1500
	M31–131W	295	90	310	28	635	6.3	300	600	32–85	16	900/1500
38 (15 inch)	**M38–200**	352	70	494.5	37	635	6.3	190	800	50–110	18	1800/3000
	M38–201[3]	352	70	494.5	37	635	6.3	190	800	50–110	18	1800/3000
51 (20 inch)	**M51–130**	480	90	511	37	805	6.3	190	800	50–110	18	2700/4000
	M51–131[4]	480	90	511	37	805	6.3	190	800	50–110	18	2700/4000
	M51–132[5]	480	90	511	37	805	6.3	190	800	50–110	18	2700/4000
	230M51	508	90	475	28	1418	6.3	190	400	60–110	25	2000/3300

Flying spot scanner tube

Heater 6.3 V/300 mA; magnetic deflection

type	min useful screen dia. mm	deflection angle deg.	neck diameter mm	typ accelerator voltage		max overall length mm	focusing
				first V	final kV		
Q13–110GU	108	40	38	–	25	347	magnetic

1) Photographic screen quality
2) With bonded face and metal mounting band
3) With pre-adjusted deflection coil AT1991 (portrait or landscape format)
4) With pre-adjusted deflection coil AT1991 (landscape format)
5) With pre-adjusted deflection coil AT1991 (portrait format)

Survey of screen phosphors

For detailed information see Data Handbook T5

Screen phosphors and equivalents

type designation						
Pro Electron	old	JEDEC	fluorescence colour	phosphorescence colour	persistence	typical use
BE	B	P11	blue	blue	medium short	oscillography and photography
GH	H	P31	green	green	medium short	general purpose oscillography
GM	P	P7	purplish-blue	yellowish-green	long	low-speed oscillography
GR	–	P39	green	green	long	monitoring and display devices
GU	–	–	white	white	very short	colour flying spot scanners
GY	–	P43	green	green	medium	oscillography
W	W	P4	white	–	medium short	television and monitoring devices
WA	–	–	white	–	medium short	studio monitors (white point matched to colour tv white point, D6500)
WE	–	P45	white	white	medium short	with high burning resistivity (thanks to rare earth additives)

General data
Plumbicon® tubes

For detailed information on these and other types see Data Handbook T10

Photoconductive layer: lead oxide

ACT	Anti comet tail
BL	Bias light
D	Diode
ED	Electrostatic deflection
EF	Electrostatic focus
ER	With extended red response
ER(F)	With extended red exponse and IR reflecting filter on anti–halation glass disc
HR	High resolution
HSD	High stability diode
IG	Industrial grade
LOC	Low output capacitance
SR	Standard resolution

Plumbicon® tubes 1,25 inch (30 mm)

type	max length mm	photo–conductive layer
XQ1022	204	SR/X–RAY
XQ1410	216	HR/BL
XQ1410L	216	HR/BL
XQ1410R	216	HR/BL
XQ1410G	216	HR/BL
XQ1410B	216	HR/BL
XQ1413R	216	ER/BL
XQ1415R	216	ER(F)/BL
XQ1415L	216	ER(F)/BL
XQ1520	216	HR/ACT/BL
XQ1520L	216	HR/ACT/BL
XQ1520R	216	HR/ACT/BL
XQ1520G	216	HR/ACT/BL
XQ1520B	216	HR/ACT/BL
XQ1523R	216	ER/ACT/BL
XQ1525R	216	ER(F)/ACT/BL
XQ1525L	216	ER(F)/ACT/BL
XQ3440	216	HR/D/LOC/BL
XQ3440L	216	HR/D/LOC/BL
XQ3440R	216	HR/D/LOC/BL
XQ3440G	216	HR/D/LOC/BL
XQ3440B	216	HR/D/LOC/BL
XQ3443R	216	ER/D/LOC/BL
XQ3445R	216	ER(F)/D/LOC/BL

Plumbicon® tubes 1 inch (25 mm)

'rear loading' type	'front loading' type	max length mm	photo–conductive layer
	XQ1070	167	SR
	XQ1070L	167	SR
	XQ1070R	167	SR
	XQ1070G	167	SR
	XQ1070B	167	SR
XQ1070/02	**XQ1070/03**	170	SR/BL
XQ1070/02L	**XQ1070/03L**	170	SR/BL
XQ1070/02R	**XQ1070/03R**	170	SR/BL
XQ1070/02G	**XQ1070/03G**	170	SR/BL
XQ1070/02B	**XQ1070/03B**	170	SR/BL
	XQ1072	162	SR/X–RAY
	XQ1073R	167	ER/SR
XQ1073/02R	**XQ1073/03R**	170	ER/SR/BL
	XQ1075R	167	ER/SR
XQ1075/02R	**XQ1075/03R**	170	ER/SR/BL
XQ1500	**XQ1510**	167	HR/ACT/BL
XQ1500L	**XQ1510L**	167	HR/ACT/BL
XQ1500R	**XQ1510R**	167	HR/ACT/BL
XQ1500G	**XQ1510G**	167	HR/ACT/BL
XQ1500B	**XQ1510B**	167	HR/ACT/BL
XQ1503R	**XQ1513R**	167	ER/ACT/BL
XQ1505R	**XQ1515R**	167	ER(F)/ACT/BL
XQ2172/02	**XQ2172/03**	170	X–RAY
	XQ2172/03X	165	X–RAY
XQ3070*		170	HR/LOC/D/BL
XQ3070L*		170	HR/LOC/D/BL
XQ3070R*		170	HR/LOC/D/BL
XQ3070G*		170	HR/LOC/D/BL
XQ3070B*		170	HR/LOC/D/BL
XQ3073R*		170	ER/LOC/D/BL
XQ30735*		170	ER(F)/LOC/D/BL

* These tubes are only available in rear loading versions (02/, 05/, 12 and /15).

For detailed information on these and other types see Data Handbook T10

Photoconductive layers: lead oxide

ACT	Anti comet tail
BL	Bias light
D	Diode
ED	Electrostatic deflection
EF	Electrostatic focus
ER	With extended red response
ER(F)	With extended red exponse and IR reflecting filter on anti–halation glass disc
HR	High resolution
HSD	High stability diode
IG	Industrial grade
LOC	Low output capacitance
SR	Standard resolution

Plumbicon® tubes 2/3 inch (18 mm)

type	max length mm	photo–conductive layer
XQ1427	109	SR/
XQ1427R	109	ER/SR
XQ1427G	109	SR
XQ1427B	109	SR
XQ1428	109	SR/IG
XQ1428R	109	ER/SR/IG
XQ1428G	109	SR/IG
XQ1428B	109	SR/IG
XQ3427	108	HR/D/LOC
XQ3427R	108	ER/HR/D/LOC
XQ3427G	108	HR/D/LOC
XQ3427B	108	HR/D/LOC
XQ3457	88	HR/D/LOC/ED
XQ3457R	88	ER/HR/D/LOC/ED
XQ3457G	88	HR/D/LOC/ED
XQ3457B	88	HR/D/LOC/ED
XQ3467	112	SR/EF
XQ3467R	112	ER/SR/EF
XQ3467G	112	SR/EF
XQ3467B	112	SR/EF
XQ4187	95	HR/HSD/LOC/EF
XQ4187R	95	ER/HR/HSD/LOC/EF
XQ4187G	95	HR/HSD/LOC/EF
XQ4187B	95	HR/HSD/LOC/EF

Plumbicon® tubes 1/2 inch (14 mm)

type	max length mm	photo–conductive layer
XQ4087R	77	ER/HR/HSD/LOC/EF
XQ4087G	77	HR/HSD/LOC/EF
XQ4087B	77	HR/HSD/LOC/EF

Vidicon and Newvicon® tubes

For detailed information on these see Data Handbook T12

Photoconductive layers:

A	Standard layer (Vidicon)
B	Layer with peak response at approx. 475 nm (Vidicon)
Nw	Cadmium and zinc telluride layer (Newvicon)
Nw(IR)	Newvicon with enhanced sensitivity in near IR region
I	Integral mesh electrode
S	Seperate mesh electrode
M	Magnetic focusing
E	Electro–static focusing

Vidicon and Newvicon® tubes 1 inch (25 mm)

type	max length mm	mesh electrode	photoconductive layer	focusing
XQ1031	133	I	A	M
XQ1032	133	I	A	M
XQ1240	163	S	A	M
XQ1241	163	S	A	M
XQ1280	163	S	B	M
XQ1285	163	S	B	M
XQ1440	163	S	Nw	M
XQ1442	163	S	Nw	M
XQ1443	163	S	Nw(IR)	M
XQ1444	163	S	Nw*	M
XQ1445	133	S	Nw	M

Vidicon and Newvicon® tubes 2/3 inch (18 mm)

XQ1270	108	I	A	M
XQ1271	108	S	A	M
XQ1272	108	S	A	E
XQ1274	108	S	Nw	M
XQ1275	108	S	Nw(IR)	E
XQ1276	108	S	Nw(IR)	M
XQ1277	108	S	Nw	E
XQ1278	108	S	Nw	E
XQ1380	108	S	Nw*	M
XQ1381	108	S	Nw*	E
XQ1590	108	S	A	E

Vidicon and Newvicon® tubes 1/2 inch (11 mm)

XQ1600	85	S	A	E
XQ1601	85	S	Nw	E
XQ1602	85	S	Nw*	E

* Tube with radiation resistant faceplate

NXA1011, NXA1021, NXA1031, NXA1041

Application information and data sheets for these products are available on request

General description

The frame transfer sensor is a solid state imaging device which produces two interlaced 294–line fields (NXA1011/1021) and 251–line fields (NXA1031/1041)
(including 6 lines for dark reference and testing) with an aspect ratio of 4:3.
NXA1011: The device is compatible with CCIR TV standards and has a 7.5 mm image diagonal matching the half–inch camera tube format.
NXA1021: The sensor is equipped with an on–chip colour stripe filter. The device is compatible with PAL and SECAM TV standards and has a 7.5 mm image diagonal matching the half–inch camera tube format.
NXA1031: The device is compatible with EIA TV standards and has a 7.5 mm image diagonal matching the half–inch camera tube format.
NXA1041: The sensor is equipped with an on–chip colour stripe filter. The device is compatible with NTSC TV standards and has a 7.5 mm image diagonal matching the half–inch camera tube format.

Applications

- Surveillance cameras – solid state reliability, high resolution and sensitivity of the quality to provide ideal successors for the Newvicon® or Ultricon® pick–up element (NXA1011/1031) and for stripe filter camera tubes (NXA1021/1041)
- Visual aids – the low voltage and mechanical ruggedness of this device allow design of safe and reliable cameras for visual aids

NXA1011/1031

- ENG cameras – the high blue sensitivity and good horizontal resolution make this sensor very suitable for 3–chip ENG colour cameras
- Character and pattern recognition – excellent linearity and uniformity recommend this sensor as first choice for these applications
- Robotics – the small size, light–weight and mechanical ruggedness make this sensor extremely suitable for all types of high resolution robot–vision applications

NXA1021/1041

- Consumer entertainment cameras
- Slide and film scanners for consumer applications
- Industrial colour camra applications

Features

- Effective number of elements: 604 – horizontal x 576 – vertical (NXA1011/1021); 610 – horizontal x 488 – vertical (NXA1031/1041)
- Cyan, green, yellow and stripe filter on the chip (NXA1021/1041 only)
- Dark reference: 1 line per field for black clamping
- 100x anti–blooming margin
- Gamma is 1
- High sensitivity, low noise
- Freedom from lag, burn–in, geometrical distortion and microphonic noise

Device organization

- Frame transfer charge coupled device
- Unit cell size: 10 µm – horizontal x 15.6 µm – vertical (NXA1011/1021 only)
- Unit cell size: 9.9 µm – horizontal x 18.6 µm – vertical (NXA1031/1041 only)
- Separate outputs for the cyan, green and yellow channels (NXA1021/1041 only)
- Dummy elements; the first 5 elements of the 3 output registers are dummy elements
- Chip size: 6.95 mm – horizontal x 9.35 mm – vertical
- On–chip high sensitive output amplifier
- Image area: 6.0 mm – horizontal x 4.5 mm – vertical

Caution: The image sensor is a MOS device which can be destroyed by static charging of the gates. Always store the device with short–circuiting clamps or on conductive foam plastic.
When cleaning the glass window always use alcohol or acetone. Rub the window carefully and slowly. Dry rubbing of the window may cause static charges which can destroy the device.

Selection guide
Geiger–Müller tubes

For detailed information on these and other types see Data Handbook T6

Cylinder tubes

type	sensitive for: α	β	γ	counting rate at 10^{-2} mGy/h** count/s	sensitive length mm	plateau: threshold V	length V	slope %/V	dead time µs	background shielded count/min	dose rate range mGy/h
ZP1200			●	28	40	400	200	0.04	90	10	10^{-3} – 10^{2}
ZP1201*			●	20	40	400	200	0.04	110	10	10^{-3} – 40
ZP1210			●	110	140	400	100	0.15	200	70	3 x 10^{-4} – 10
ZP1220			●	180	240	400	100	0.15	210	90	2 x 10^{-4} – 3
ZP1300		●	●	300***	7	500	100	0.30	11	1	10^{-1} – 2 x 10^{4}
ZP1301*			●	340***	7	500	100	0.30	13	1	10^{-1} – 2 x 10^{4}
ZP1302*			●	340***	7	500	100	0.30	13	120	10^{-1} – 2 x 10^{4}
ZP1310		●	●	1600***	16	500	150	0.15	15	2	2 x 10^{-2} – 4 x 10^{3}
ZP1313*			●	1600***	16	500	150	0.15	15	2	10^{-2} – 3 x 10^{-3}
ZP1320		●	●	9	28	500	150	0.08	45	12	3 x 10^{-3} – 2 x 10^{2}
ZP1321*			●	9	28	500	150	0.08	55	12	3 x 10^{-3} – 10^{2}
ZP1330		●	●	65	75	450	350	0.02	70	30	6 x 10^{-4} – 10

Cosmic ray guard tube

type	α	β	γ	counting rate	sensitive length	threshold V	length V	slope %/V	dead time µs	background count/min	dose rate range mGy/h
ZP1700			●	–	–	800	400	0.03	1000	70	3 x 10^{-4} – 3 x 10^{-1}

Window tubes

type	sensitive for: α	β	γ	counting rate at 10^{-2} mGy/h** count/s	window ∅/type mm	plateau threshold V	length V	slope %/V	dead time µs	background shielded count/min	dose rate range mGy/h
ZP1400		●	●	25	9c	400	200	0.04	90	10	10^{-3} – 10^{2}
ZP1401	●	●	●	25	9a	400	200	0.04	90	10	10^{-3} – 10^{2}
ZP1410	●	●	●	32	19.8a	450	250	0.02	175	15	10^{-3} – 10
ZP1430	●	●	●	44	27.8c	450	250	0.04	230	25	6 x 10^{-4} – 6
ZP1431		●	●	44	27.8c	450	250	0.04	230	25	6 x 10^{-4} – 6
ZP1441	●	●	●	16	19.8a	500	200	0.09	65	5	3 x 10^{-3} – 10^{2}
ZP1442		●	●	16	19.8c	500	200	0.09	65	8	3 x 10^{-3} – 10^{2}
ZP1451	●	●	●	29	27.8a	500	250	0.07	60	9	10^{-3} – 20
ZP1452		●	●	29	27.8c	500	250	0.07	60	18	10^{-3} – 20
ZP1470		●	●	38	24.1b	550	150	0.15	70	25	10^{-3} – 20
ZP1480		●	●	24	17d	400	100	0.20	120	30	10^{-3} – 20
ZP1481		●	●	24	17d	400	100	0.20	120	30	10^{-3} – 20
ZP1490	●	●	●	20	28a	450	250	0.06	50	15	10^{-3} – 20

X–ray sensitive tubes

type	sensitive for	counting rate	window	threshold	length	slope	dead time	background	dose rate range
ZP1600	6.0–20 keV	660	19.8e	1600	400	0.07	110	25	–
ZP1610	2.5–40 keV	–	7x18f	operating voltage 1550 V					

* With compensating filter
** 1R = 8.69 mGy
*** Counting rate at 10 mGy

Window thickness mg/cm^{2}:
a:1.5 to 2.0; b:1.5 to 2.5; c:2.0 to 3.0
d:2.5 to 3.0; e:12.5 to 3.5; f:2.0 to 2.5

Geiger–Müller tubes (cont.)

For detailed information on these and other types see Data Handbook T6

High temperature tubes

type	sensitive for: α	β	γ	counting rate at 10^{-2} mGy/h* count/s	sensitive length mm	plateau threshhold V	plateau length V	plateau slope %/V	dead time µs	background shielded count/min	dose rate range mGy/h
ZP1800			●	190	419	700	150	0.08	75	25	2×10^{-4} – 4
ZP1810			●	13	51	650	250	0.08	75	25	3×10^{-3} – 40
ZP1820			●	110	203	450	250	0.06	100	65	3×10^{-4} – 4
ZP1830			●	170	313	450	250	0.06	100	100	2×10^{-4} – 2
ZP1840			●	8	32	850	200	0.08	50	15	4×10^{-3} – 10^{2}
ZP1850		●	●	36	89	875	200	0.10	100	50	1×10^{-3} – 20
ZP1860		●	●	80	220	875	200	0.10	100	75	4×10^{-4} – 4

* 1R = 8.69 mGy

PHILIPS

General data
Image intensifiers

For detailed information on these and other types see Data Handbook T13

type	XX1332	XX1380	XX1390	XX1410	XX1500	XX1500TV	XX1500TVMC	
Photocathode	S25	S25	S25	S25	S25	S25	S25	
White light sensitivity	320	350	400	420	350	350	350	µA/lm
Sensitivity at 800 nm	28	35	35	40	35	35	35	mA/W
Sensitivity at 850 nm	17	30	30	30	25	25	25	mA/W
Gain	45000	22000	–	10000	45000	65000	65000	
Modulation transfer factor								
2.5 lp/mm	90	96		89	92	92	92	%
7.5 lp/mm	70	81		60	67	67	67	%
15 lp/mm	45	53		30	33	33	33	%
Limiting resolution	23	51	29	29	36	36	36	lp/mm
Useful photocathode area	49∅	20∅	18∅	18∅	18∅	15 x 11	15 x 11	mm

Photomultipliers: survey of types

For details of these and other types see Data Handbook T9

Photomultipliers
(Type survey continues on next page)

photocathode	use–ful dia mm	type	no. of stages	photocathode spectral sensitivity, $sk_e(\lambda)$ mA/W	λ (nm)	anode sensitivity 1) A/lm 2) A/lmF 3) kA/W 4) gain	at total voltage V	rise time ns	anode pulse linearity mA
bialkaline SbKCs on quartz window	44	**XP2020/Q**	12	80	400	4) 3 x 10^7	2200	1.5	280
bialkaline SbRbCs on quartz window	32	**XP2018B**	10	75	440	3) 60	1350	2.5	200
bialkaline SbKCs on UV–glass window	110	**XP2041**	14	85	400	4) 3 x 10^7	2200	2.0	280
bialkaline SbKCs	14	**XP1911**	10	80	400	2) 10	1200	2.3	80
	23	**XP2962**	8	75	400	2) 1	1100	1.8	80
	23	**XP2972** +	10	75	400	2) 10	1300	1.9	80
	23	**XP2982**	11	75	400	2) 30	1350	1.9	80
	32	**XP2012***	10	90	400	3) 60	1350	2.5	200
	34	**XP2062***	10	85	400	2) 7.5	1300	2.5	200
	34	**XP2072***	10	95	400	2) 7.5	1230	2.5	200
	44	**XP2020**	12	85	400	4) 3 x 10^7	2200	1.5	280
	44	**XP2202***	10	75	400	3) 60	1400	3.5	200
	44	**XP2212*** +	12	75	400	4) 3 x 10^7	1900	4.0	250
	44	**XP2242B**	6	80	400	4) 10^4	1100	1.6	350
	45	**XP2252***	12	80	400	4) 3 x 10^7	1850	2.0	250
	44	**XP2262***	12	80	400	4) 3 x 10^7	1850	2.0	250
	46	**XP2102*** +	10VB	85	400	2) 1.5	1250	10	10
	46	**XP3102*** +	8	90	400	2) 1.5	950	3.0	100
	46	**XP3202*** +	8	75	400	2) 1.5	950	3.0	100
	56	**XP2432*** +	10VB	90	400	2) 1.5	1250	10	10
	56H	**XP3422*** +	8	90	400	2) 1.5	950	3.0	100
	68	**XP2312***	12	85	400	4) 3 x 10^7	2000	2.5	250
	68	**XP3462*** +	8	85	400	4) 10^6	1350	3.0	200
	70	**XP2412*** +	10VB	105	400	2) 1.5	1250	11	10
	110	**XP2050**	10VB	95	400	3) 12	1270	16	10

H = hexagonal shape, dimensions between flats; for other hexagonal tubes please contact us
VB = venetian blind multiplier
* = also available with plastic base by adding B to the type number
+ = can be supplied with standard or customized integral PC–board voltage divider.
we also supply Vacuum Photo Triodes upon request

Photomultipliers: survey of types

For details of these and other types see Data Handbook T9

Photomultipliers (cont.)

photocathode	use–ful dia mm	type	no. of stages	photocathode spectral sensitivity, $sk_e(\lambda)$		anode sensitivity 1) A/lm 2) A/lmF 3) kA/W 4) gain		rise time ns	anode pulse linearity mA
				mA/W	λ (nm)		at total voltage V		
trialkaline SbNaKCs (S20)	14	**XP1117+**	9	13	700	1) 30	1520	3.5	30
	23	**XP2963**	8	20	700	1) 6	1120	1.8	80
	32	**XP2023B**	8	20	700	1) 6	1120	2.5	200
	44	**XP2203B**	10	16	700	1) 60	1350	3.5	200
	44	**XP2233B**	12	15	700	4) 3 x 10^7	2050	2.0	250
trialkaline SbNaKCs on quartz window	44	**XP2254B**	12	15	700	4) 3 x 10^7	2300	1.5	280
trialkaline SbNaKCs (S20R)	34	**XP2017B**	10	6.5	860	1) 60	1200	2.5	200
bialkaline SbRbCs	20	**AV29**	diode	80	440	C_{ak} = 6 pF	1–1000	3.0	15 x 10^{-3}
bialkaline SbKCs	20 x 20	**XP4702**	10**	40	400	4) 10^6	1400	4.8	

Electronmultiplier

photocathode	use–ful dia mm	type	no. of stages	photocathode spectral sensitivity, $sk_e(\lambda)$		anode sensitivity		rise time ns	anode pulse linearity mA
				mA/W	λ (nm)		at total voltage V		
CuBe	5 x 10	**XP1600**	16	11	68	10^7	2500	3.0	

** = 64 channel photomultiplier

+ = can be supplied with standard or customized integral PC–board voltage divider.

Channel electron multipliers

For detailed information on these and other types see Data Handbook T9

Single channel electron multipliers

PULSED type	input configuration	dimen–sions nom. (mm)	resistance typ Ω	gain[2] at 2.5 kV	starting voltage typ. kV	operating voltage max. kV	status[7]
X710BL	tubular	∅ 2.2	3×10^{8}	1.5×10^{8}	1.6	4.0	D
X713BL	rectangular	3.5 x 15.5	3×10^{8}	1.5×10^{8}	1.6	4.0	D
X714BL	rectangular	3.5 x 15.5	3×10^{8}	1.5×10^{8}	1.6	4.0	D
X719BL	conical	∅ 10	3×10^{8}	1.5×10^{8}	1.6	4.0	D
X810BL	tubular	∅ 1.25	7×10^{8}	1×10^{8}	1.6	3.5	C
X812BL	rectangular	2 x 8	7×10^{8}	1×10^{8}	1.6	3.5	C
X814BL	rectangular	2 x 8	7×10^{8}	1×10^{8}	1.6	3.5	C
X818BL	conical	∅ 5	7×10^{8}	1×10^{8}	1.6	3.5	C
X910BL	tubular	∅ 2.2	6×10^{8}	1×10^{8}	1.6	4.0	C
X913BL	rectangular	3.5 x 15.5	6×10^{8}	1×10^{8}	1.6	4.0	C
X914BL	rectangular	3.5 x 15.5	6×10^{8}	1×10^{8}	1.6	4.0	C
X919BL	conical	∅ 10	6×10^{8}	1×10^{8}	1.6	4.0	C
X959BL	conical	∅ 15	6×10^{8}	1×10^{8}	1.6	4.0	C

ANALOGUE type	input configuration	dimensions nominal (mm)	resistance typ Ω	gain[2]	max. average output curr. μA	operating voltage max. kV	status[7]
X636AL[4][5][6]	elliptical	12.5 x 11.5	1.5×10^{8}	5×10^{7}	7	3	D
X645AL[5]	conical	∅ 15	1.0×10^{8}	1×10^{6}	10	3	D
X646AL[4][5]	elliptical	12.5 x 11.5	1.0×10^{8}	1×10^{6}	10	3	D
X650 series*							

1. Open ended versions available: change BL to AL when ordering
2. Equivalent threshold of 2×10^{7} electrons for 300 and 400 series, 2×10^{6} for all other types
3. Measured at 3 kV
4. Different cone angles and sizes available
5. A guard ring collector and connecting strips can be supplied; change AL to CL when ordering
6. May be operated in pulse or analogue mode
7. Status:

D = design; recommended for new equipment design
C = current; available for equipment production and use in existing equipment.

* various mounted types available

Channel electron multipliers (cont.)

For detailed information on these and other types see Data Handbook T9

type	useful dimensions mm	plate thickness mm	channel diameter µm	channel angle degrees	resistance MΩ	gain at 1 kV min.	max. operating voltage kV
G12–20x50	18.8 x 48.8	0.5 ±0.1	12.5	13	80 to 300	10^3	2
G12–25SE	∅ 19	0.5 ±0.02	12.5	13	200 to 750	10^3	2
G12–25SE/A	∅ 19	0.5 ±0.02	12.5	13	200 to 750	10^3	2
G12–36	∅ 32.5	0.5 ±0.02	12.5	13	80 to 300	10^3	2
G12–36/A	∅ 32.5	0.5 ±0.02	12.5	13	80 to 300	10^3	2
G12–36DT/0	∅ 32.5	1.0 ±0.02	12.5	0	160 to 600	10^4	3
G12–36DT/13	∅ 32.5	1.0 ±0.02	12.5	13	160 to 600	10^4	3
G12–46	∅ 42	0.5 ±0.02	12.5	13	30 to 100	10^3	1.5
G12–46/A	∅ 42	0.5 ±0.02	12.5	13	30 to 100	10^3	1.5
G12–46DT/0	∅ 42	1.0 ±0.02	12.5	0	60 to 250	10^4	3
G12–46DT/13	∅ 42	1.0 ±0.02	12.5	13	60 to 250	10^4	3
G12–70	∅ 67	0.5 ±0.02	25	13	20	10^3	1.5
G25–20x50	18 x 48.8	1.0 ±0.1	25	13	35	10^3	2
G25–25	∅ 26.5	1.0 ±0.1	25	13	30 to 150	10^3	2
G25–25/A	∅ 26.5	1.0 ±0.1	25	13	30 to 150	10^3	2
G25–50	∅ 51.8	1.0 ±0.1	25	13	7 to 40	10^3	2
G25–70	∅ 68	1.0 ±0.1	25	13	5	10^3	2

All values above are quoted per plate
Type designations: A = supplied in matched resistance pairs for cascade operation;
SE = solid edge plate; Dt = double thickness

Pulsed Power Klystrons

For detailed information on these and other types see Data Handbook T3

								heater		foc.	cooling	
type	status	frequency MHz	peak output power MW	pulse duration µs	gain dB	beam voltage kV	beam current A	voltage V*	current A		col–lector	body
YK1110	C	2998 ± 5	6	2.2	30	210	100	3–4.6	70–82	EM	W	W
YK1510 **note 1**	P	S–band	> 20	4	44	240	254	15–30	20–30	EM	VC	W
YK1511 **note 2**	P	S–band	> 20	4	44	240	254	15–30	20–30	EM	VC	W
YK1512 **note 3**	P	S–band	> 20	4	44	240	254	15–30	20–30	EM	VC	W
YK1600	P	2998.5	⩾ 35	4.5	52	270	280	17–25	18–24	EM	W	W

Notes
1. Equivalent to TV 2030 B8
2. Equivalent to TV 2030 C8
3. Equivalent to TV 2030 D8

* the exact value is marked on each tube test report

foc. : EM = electromagnetic
cooling: W = water
VC = vapour condensation

U.H.F–klystrons

For detailed information on these and other types see Data Handbook T3

type	status	output power (sync) kW	operating efficiency %	frequency MHz	beam voltage kV	beam current A	heater		foc.	cooling	
							voltage V	current A		col–lector	body
YK1001	C	11	43	470–860	18.5	1.9	7.8	32	PPM	FA	FA
YK1151	C	22	37	470–860	19.5–24.5	2.6–3.6	7.0	30	PPM	FA	FA
YK1190 note 3	C	45	42.5	470–610	20.5–22.0	4.8–6.3	8.5	22.0–27.0	EM	V,VC,W	W
YK1290 notes 1,2,3	C	45	42.5	470–610	20.5–22.0	4.8–6.3	8.5	22.0–27.0	EM	V,VC,W	W
YK1191 note 3	C	45	42.5	590–720	20.5–22.0	4.8–6.3	8.5	22.0–27.0	EM	V,VC,W	W
YK1291 notes 1,2,3	C	45	42.5	590–720	20.5–22.0	4.8–6.3	8.5	22.0–27.0	EM	V,VC,W	W
YK1192 note 3	C	45	42.5	710–860	23	4.6	8.5	22.0–27.0	EM	V,VC,W	W
YK1292 notes 1,2,3	C	45	42.5	710–860	23	4.6	8.5	22.0–27.0	EM	V,VC,W	W
YK1295 note 2	C	58	40–46	470–610	22.5–26.0	4.85–6.4	8.5	22.0–27.0	EM	V,VC,W	W
YK1296 note 2	C	58	40–46	590–720	22.5–26.0	4.85–6.4	8.5	22.0–27.0	EM	V,VC,W	W
YK1297 note 2	C	58	42–44	710–860	23.5–27.0	4.9–5.9	8.5	22.0–27.0	EM	V,VC,W	W
YK1220	C	16.5	43–47	470–860	15.5–19.0	1.95–2.6	5.0	19.5–22.5	EM	V,VC,W	FA
YK1223 notes 1,2	P	16.5	43–47	470–860	15.5–19.0	1.95–2.6	5.0	19.5–22.5	EM	V,VC,W	FA
YK1230	C	32	41–45	470–860	21.0–25.0	2.85–3.7	5.0	19.5–22.5	EM	V,VC,W	FA
YK1233 notes 1,2	P	32	41–45	470–860	21.0–25.0	2.85–3.7	5.0	19.5–22.5	EM	V,VC,W	FA
YK1263 note 1	P	58	42–46	470–810	23.0–26.0	4.85–6.0	8.5	22.0–27.0	EM	V,VC,W	FA
YK1265 note 1	P	64	43–48	470–810	24.5–26.5	5.0–6.1	8.5	22.0–27.0	EM	V,VC,W	FA

1. ABC–types
2. ABC–types for refit in existing networks using non ABC–types
3. Interchangeable with EEV–types

foc.: PPM = periodic permanentmagnetic
EM = electromagnetic

cooling: FA = forced air
W = water
V = vapour
VC = vapour condensation

Continuous–wave high–power klystrons

For detailed information on these and other types see Data Handbook T3

cooling				C.W.				heater				
type	status	freq. MHz	C.W. output power kW	drive power W	effic. %	beam voltage kV	beam current A	voltage V	current A	foc.	col–lector	body
YK1300	P	499.7	500–600	25–50	57–60	60–65	4.0–16.5	22–27	20–25	EM	W	W
YK1301	P	499.7	600–800	40–70	60–61	75–77	4.0–18.0	22–27	20–25	EM	W	W
YK1302	P	508.6	800	60–80	60–60.5	76–80	16.5	22–27	20–25	EM	V	W
YK1303 note 1	P	508.6	1000	80	60–60.5	88–90	18.5–19.0	22–27	20–25	EM	V	W
YK1305	P	499.7	⩽ 350	16–30	55–58	47–49	4.0–13.0	22–27	20–25	EM	W	W
YK1350	P	352.21	1000	90	68	90	16.3	22–27	20–25	EM	W	W

Note 1
Data available on request.
Focusing: EM = electromagnetic.

Cooling: W = water.
V = vapour.

PHILIPS

Isoductors, circulators and isolators

For detailed information on these and other types see Data Handbook T11

Isoductors

type	freq. range MHz	max. power		insertion loss dB	isolation dB	VSWR	temperature range °C	connector
		forward W	reflected W					
2722 162 09002	68–150	40	total reflection permitted	≤ 0.9*	≥ 20	≤ 1.22	0 to 60	solder pins
2722 162 09012	140–260	40		≤ 0.6	≥ 20	≤ 1.22	0 to 60	solder pins
2722 162 09022	230–470	40		≤ 0.5	≥ 20	≤ 1.22	0 to 60	solder pins

VHF narrow band circulators/isolators

type	freq. range MHz	max. power		insertion loss dB max/typ	isolation dB min/typ	VSWR max/typ	temperature range °C	connector
		CW W	reflected W					
2722 162 02912	72–73	20	20	0.7	–	–	0 to 50	–
2722 162 02732	73–74	20	20	0.8	–	–	0 to 55	–
2722 162 02722	83–84	20	20	0.7	–	–	0 to 55	–
2722 162 05751	146–165**	110	110	0.7	–	–	0 to 50	–
2722 162 05761	160–174**	110	110	0.8	–	–	0 to 55	–
2722 162 06291	201–209	100	100	0.7	–	–	0 to 55	–

VHF broad band circulators/isolators

type	freq. range MHz	max. power		insertion loss dB max/typ	isolation dB min/typ	VSWR max/typ	temperature range °C	connector
		CW W	reflected W					
2722 162 03342	96–146	50	–	1.3	18	1.3	–10 to +60	N female
2722 162 03332	96–146	50	–	1.3	18	1.3	–10 to +60	SMA female
2722 162 05991	88–108	50	–	0.8	18	1.3	–10 to +50	N female
2722 162 07021	88–108	300	–	0.8	16	1.4	–10 to +50	N female
2722 162 05881	100–163	75	–	1.5	14	1.5	–20 to +55	N female
2722 162 05891	88–108	300	–	1.5	14	1.5	–20 to +55	N female
2722 162 03732	225–400	60	–	1.3	16	1.3	–40 to +80	N female
2722 162 03722	225–400	60	–	1.3 – 1.0	16	1.3	–40 to +80	SMA female
2722 162 05781	225–400	200	–	0.75	17	1.35	0 to 55	N female
2722 162 06111	600–960	10	–	0.9 – 0.6	13 – 15	1.65 – 1.4	–25 to +65	SMA female
2722 162 05321	600–960	10	–	0.9 – 0.6	13 – 15	1.65 – 1.4	–25 to +65	SMA female
2722 162 01931	225–270	150	–	0.35–0.2	18 – 21	1.35 – 1.25	0 to 70	N female
2722 162 01941	270–330	150	–	0.35–0.2	18 – 21	1.35 – 1.25	0 to 70	N female
2722 162 01951	330–400	150	–	0.35–0.3	18 – 21	1.35 – 1.25	0 to 70	N female

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* when ≤ 100 MHz, ≤ 0,7 when > 100 MHz

** Tunable instantaneous bandwidth min. 5 MHz

Isoductors, circulators and isolators (cont.)

For detailed information on these and other types see Data Handbook T11

HF circulators/isolators

type	freq. range MHz	max. power		insertion loss dB max/typ	isolation dB min/typ	VSWR max/typ	temperature range °C	connector
		CW W	reflected W					
2722 162 02712	400–470	20	–	0.5	20	1.25	–10 to +60	N female
2722 162 06161	406–470	100	–	0.8 – 0.7	50 – 55	1.25 – 1.15	–20 to +60	N female
2722 162 02857	460–468	100	–	0.6 – 0.4	50 – 55	1.25 – 1.115	–10 to +60	N female
2722 162 03411	400–470	100	100	0.5 – 0.35	20 – 25	1.25 – 1.15	–10 to +60	N female
2722 162 05101	400–470	100	100	0.5 – 0.35	20 – 25	1.25 – 1.15	–10 to +60	SMA fem.
2722 162 01555	462–468	60	–	0.5	25	1.2	–10 to +60	N female
2722 162 06671	806–960	100	–	0.8 – 0.5	45 – 55	1.25 – 1.15	–10 to +60	N female
2722 162 06841	930–965	60	–	0.8 – 0.5	45 – 55	1.25 – 1.2	–10 to +60	N female

Band III circulators

type	freq. range MHz	max. power		insertion loss dB max/typ	isolation dB min/typ	VSWR max/typ	temperature range °C	connector
		CW W	peak W					
2722 162 01871	160–178	500	850	0.35 – 0.3	20 – 24	1.25 – 1.15	–10 to +60	N female
2722 162 01861	173–204	500	850	0.35 – 0.3	20 – 24	1.25 – 1.15	–10 to +60	N female
2722 162 01851	200–230	500	850	0.35 – 0.3	20 – 24	1.25 – 1.15	–10 to +60	N female
2722 162 03171	225–270	500	850	0.35 – 0.3	20 – 24	1.25 – 1.15	–10 to +60	N female
2722 162 01901	160–178	1000	1800	0.35 – 0.3	20 – 24	1.25 – 1.15	–10 to +60	RF 7/16 female
2722 162 01891	173–204	1000	1800	0.35 – 0.3	20 – 24	1.25 – 1.15	–10 to +60	RF 7/16 female
2722 162 01881	200–230	1000	1800	0.35 – 0.3	20 – 24	1.25 – 1.15	–10 to +60	RF 7/16 female
2722 162 03181	225–270	1000	1800	0.35 – 0.3	20 – 24	1.25 – 1.15	–10 to +60	RF 7/16 female

Band IV/V, circulators/isolators

type	freq. range MHz	max. power		insertion loss dB max/typ	isolation dB min/typ	VSWR max/typ	temperature range °C	connector
		CW W	peak W					
2722 162 02691	470–600	10	100	0.5 – 0.35	20 – 25	1.25 – 1.15	–10 to +60	N female
2722 162 02701	600–800	10	100	0.5 – 0.35	20 – 25	1.25 – 1.15	–10 to +60	N female
2722 162 02401	790–1000	10	100	0.5 – 0.35	20 – 25	1.25 – 1.15	–10 to +60	N female
2722 162 01551	470–600	100	200	0.5 – 0.35	20 – 25	1.25 – 1.15	–10 to +60	N female
2722 162 01563	550–650	100	200	0.5 – 0.35	20 – 25	1.25 – 1.15	–10 to +60	N female
2722 162 01561	600–800	100	200	0.5 – 0.35	20 – 25	1.25 – 1.15	–10 to +60	N female
2722 162 03261	790–1000	100	200	0.5 – 0.3	20 – 25	1.25 – 1.14	–10 to +60	N female
2722 162 03263*	790–1000	100	200	0.5 – 0.3	20 – 25	1.25 – 1.14	–10 to +60	N female

* Low noise

Isoductors, circulators and isolators (cont.)

For detailed information on these and other types see Data Handbook T11

Band IV/V circulators

type	freq. range MHz	max. power		insertion loss dB max/typ	isolation dB min/typ	VSWR max/typ	temperature range °C	connector
		CW W	peak W					
2722 162 01572	400–470	300	500	0.35 – 0.2	20 – 25	1.25 – 1.15	–10 to +60	N female
2722 162 01582	470–600	300	500	0.35 – 0.2	20 – 25	1.25 – 1.15	–10 to +60	N female
2722 162 01592	590–720	300	500	0.35 – 0.2	20 – 25	1.25 – 1.15	–10 to +60	N female
2722 162 01612	710–860	300	500	0.35 – 0.2	20 – 25	1.25 – 1.15	–10 to +60	N female
2722 162 01632	470–600	300	500	0.35 – 0.2	20 – 25	1.25 – 1.15	–10 to +60	HF 7/16 female
2722 162 01642	590–720	300	500	0.35 – 0.2	20 – 25	1.25 – 1.15	–10 to +60	HF 7/16 female
2722 162 01662	710–860	300	500	0.35 – 0.2	20 – 25	1.25 – 1.15	–10 to +60	HF 7/16 female
2722 162 01121	470–600	500	900	0.35 – 0.25	22 – 24	1.2 – 1.15	–10 to +70	N female
2722 162 03191	600–800	500	900	0.35 – 0.25	22 – 24	1.2 – 1.15	–10 to +70	N female
2722 162 01131	590–720	500	900	0.35 – 0.25	20 – 24	1.2 – 1.15	–10 to +70	N female
2722 162 01141	710–860	500	900	0.35 – 0.25	20 – 24	1.2 – 1.15	–10 to +70	N female
2722 162 05371	470–600	700	8000	0.4	20	1.25	+5 to +65	HF 7/16 female
2722 162 05381	590–720	700	8000	0.4	20	1.25	+5 to +65	HF 7/16 female
2722 162 05391	710–860	700	8000	0.4	20	1.25	+5 to +65	HF 7/16 female
2722 162 01261	470–600	2000	2000	0.35 – 0.75	20 – 24	1.25 – 1.15	–10 to +40	HF 7/16 female
2722 162 01331	600–800	2000	2000	0.35 – 0.75	20 – 24	1.25 – 1.15	–10 to +40	HF 7/16 female
2722 162 01281	590–720	2000	2000	0.35 – 0.75	22 – 26	1,2 – 1.15	–10 to +40	HF 7/16 female
2722 162 01141	710–860	500	900	0.35 – 0.75	22 – 26	1.2 – 1.15	–10 to +40	HF 7/16 female
2722 162 03051	470–600	2000	8000	0.4	20	1.25	+5 to +40	HF 13/30 female
2722 162 03061	590–720	2000	8000	0.4	20	1.25	+5 to +65	HF 13/30 female
2722 162 03071	710–860	2000	8000	0.4	20	1.25	+5 to +65	HF 13/30 female

For detailed information on these and other types see Data Handbook T11

Circulators/isolators 1 to 3 GHz

type	freq. range MHz	max. power		insertion loss dB max/typ	isolation dB min/typ	VSWR max/typ	temperature range °C	connector
		CW W	reflected W					
2722 162 02492	1427–1535	10	–	0.4 – 0.3	20 – 24	1.15 – 1.12	0 to 55	N female
2722 162 03802	1427–1535	10	–	0.4 – 0.3	20 – 24	1.15 – 1.12	0 to 55	N female
2722 162 05331	1350–1700	10	–	0.4 – 0.3	20 – 23	1.2 – 1.15	0 to 45	SMA female
2722 162 05571	1350–2100	10	–	0.5	17	1.35	–15 to +65	SMa female
2722 162 06701	1350–2100	10	–	0.5	17	1.35	–15 to +65	SMa female
2722 162 03591	960–1225	100	–	0.5–0.35	20 – 22	1.25 – 1.2	–10 to +60	N female
2722 162 02571	1700–2100	15	15	0.25	26	1.11	0 to 55	SMA 2xfemale
2722 162 02591	1900–2300	15	15	0.25	26	1.11	0 to 55	1 x male
2722 162 05311	1700–2100	10	–	0.4	20	1.2	–20 to +55	SMA female
2722 162 05341	1900–2300	10	–	0.4	20	1.2	–20 to +55	SMA female
2722 162 05351	2100–2500	10	–	0.4	20	1.2	–20 to +55	SMA female
2722 162 05361	2300–2700	10	–	0.4	20	1.2	–20 to +55	SMA female
2722 162 05401	2450–2850	10	–	0.4	20	1.2	–20 to +55	SMA female
2722 162 05411	2000–2700	10	–	0.4	20	1.2	–20 to +55	SMA female
2722 162 03951	1700–2300	20	–	0.3	20	1.25	0 to 55	SMA female
2722 162 03941	1700–2300	50	–	0.3	20	1.25	0 to 55	N female

4–port circulators 2 GHz

type	freq. range MHz	max. power		insertion loss dB max/typ	isolation dB min/typ	VSWR max – typ	temperature range °C	connector
		CW W	reflected W					
2722 162 04051	1700–2100	30	15	0.25	26	1.11	0 to 55	SMA 2 x male,
2722 162 04061	1900–2300	30	15	0.25	26	1.11	0 to 55	2 x female

Isoductors, circulators and isolators (cont.)

For detailed information on these and other types see Data Handbook T11

Circulators/isolators 4 GHz

type	freq. range MHz	max. power		insertion loss dB max/typ	isolation dB min/typ	VSWR max/typ	temperature range °C	connector
		CW W	reflected W					
2722 162 02471	4200–4400	10	1.5	0.3 – 0.25	23 – 25	1.2 – 1.12	–55 to +90	SMA female
2722 162 03431	3800–4200	10	–	0.25 – 0.2	25 – 27	1.12 – 1.1	–10 to +70	SMA female
2722 162 03441	4400–5000	10	–	0.25 – 0.2	25 – 27	1.12 – 1.1	–10 to +70	SMA female
2722 162 04031	3800–4200	10	–	0.25 – 0.2	25 – 27	1.12 – 1.1	–10 to +70	SMA female
2722 162 04041	4400–5000	10	–	0.25 – 0.2	25 – 27	1.12 – 1.1	–10 to +70	SMA female

Waveguide circulators/isolators 7 GHz

type	freq. range MHz	max. power		insertion loss dB max/typ	isolation dB min/typ	VSWR max/typ	temperature range °C	connector
		CW W	reflected W					
2722 161 02211	5925–6425	200	–	0.2	28	1.08	0 to 50	IEC–UER 70
2722 161 02311	6425–7125	200	–	0.2	28	1.08	0 to 50	IEC–UER 70
2722 161 02321	7125–7750	200	–	0.2	28	1.08	0 to 50	IEC–UER 70

Octave bandwidth circulators/isolators

type	freq. range MHz	max. power		insertion loss dB max/typ	isolation dB min/typ	VSWR max/typ	temperature range °C	connector
		CW W	refl. W					
2722 162 02091	2000–4000	50	–	0.5 – 0.35	20 – 24	1.25 – 1.15	–10 to +70	N female
2722 162 01491	2000–4000	50	–	0.5 – 0.35	20 – 24	1.25 – 1.15	–10 to +70	N female
2722 162 02101	2000–4000	50	–	0.5 – 0.35	20 – 24	1.25 – 1.15	–10 to +70	SMA female
2722 162 01501	2000–4000	50	–	0.5 – 0.35	20 – 24	1.25 – 1.15	–10 to +70	SMA female
2722 162 02071	3000–6000	20	–	0.5 – 0.3	20 – 24	1.25 – 1.15	–10 to +70	SMA female
2722 162 01511	3000–6000	20	–	0.5 – 0.3	20 – 24	1.25 – 1.15	–10 to +70	SMA female
2722 162 02111	4000–8000	10	–	0.5 – 0.3	20 – 24	1.25 – 1.15	–10 to +70	SMA female
2722 162 01811	4000–8000	10	–	0.5 – 0.3	20 – 24	1.25 – 1.15	–10 to +70	SMA female
2722 162 02122	7000–12400	10	–	0.6 – 0.35	20 – 24	1.25 – 1.15	–10 to +70	SMA female
2722 162 01822	7000–12400	10	–	0.6 – 0.4	20 – 24	1.25 – 1.15	–10 to +70	SMA female
2722 162 02221	12000–18000	5	–	0.6 – 0.35	18 – 22	1.25 – 1.2	–10 to +70	SMA female
2722 162 03301	12000–18000	5	–	0.6 – 0.35	18 – 22	1.3 – 1.2	–10 to +70	SMA female
2722 161 02071	8200–11200	50	–	0.5 – 0.3	22 – 30	1.18 – 1.15	+10 to +40	IEC–UBR 100

Isoductors, circulators and isolators (cont.)

For detailed information on these and other types see Data Handbook T11

Waveguide isolators X–BAND

type	freq. range MHz	max. power CW W	max. power reflected W	insertion loss dB max/typ	isolation dB min/typ	VSWR max/typ	temperature range °C	connector
2722 161 01221	8500–9600	1	–	0.6	15	1.15	+10 to +70	IEC–UBR 100
2722 161 01222*	8500–9600	1	–	0.6	15	1.15	+10 to +70	IEC–UBR 100
2722 161 01361	8500–9600	5	–	0.5	30	1.05	–10 to +70	IEC–UBR 100
2722 161 01211	8500–9600	10	–	0.5	30	1.05	–10 to +70	IEC–UBR 100
2722 161 01261	8500–9600	10	–	1.2	55	1.2	–10 to +70	IEC–UBR 100
2722 161 01531	10025–10325	1	–	0.4	20	1.25	–40 to +85	IEC–UBR 100

Industrial power isolators with water load

type	freq. range MHz	max. power CW W	max. power reflected W	insertion loss dB max/typ	isolation dB min/typ	VSWR max/typ	temperature range °C	connector
2722 163 02091	2350–2400	3000	3000	0.3 – 0.2	20 – 26	1.25**	∅1: max +40	IEC–PDR, m*
2722 163 02081	2350–2400	3000	3000	0.3 – 0.2	20 – 26	1.25**	∅2: max +50	output: N f*
2722 163 02071	2425–2475	3000	3000	0.3 – 0.2	20 – 26	1.25**	∅1: max +40	IEC–PDR, m*
2722 163 02061	2425–2475	3000	3000	0.3 – 0.2	20 – 26	1.25**	∅2: max +50	output: N f*
2722 163 02024	2350–2400	6500	6500	0.3 – 0.2	20 – 26	1.2** – 1.1	∅1: max +40	IEC–PDR, m*
2722 163 02025	2350–2400	6500	6500	0.3 – 0.2	20 – 26	1.2** – 1.1	∅2: max +50	output: N f*
2722 163 02004	2425–2475	6500	6500	0.3 – 0.2	20 – 26	1.2** – 1.1	∅1: max +40	IEC–PDR, m*
2722 163 02005	2425–2475	6500	6500	0.3 – 0.2	20 – 26	1.2** – 1.1	∅2: max +50	output: N f*

Industrial power circulator

type	freq. range MHz	max. power CW W	max. power W	insertion loss dB max/typ	isolation dB min/typ	VSWR max/typ	temperature range °C	connector
2722 163 01021	2425–2475	6500	–	0.3	20	1.2	∅1: max +40	IEC–PDR 26

* m = monitor
f = female

Capacitors C

Data Handbook System

On most pages, directly underneath the title, reference is made to a 'Data Handbook'. That Handbook is part of the Philips Data Handbook System which is a comprehensive source of information on electronic components, subassemblies and materials. For this catalogue section the following Handbooks are of interest:

book	title
C7	Variable capacitors
C14	Electrolytic and solid capacitors
C15	Ceramic capacitors
C22	Film capacitors

Contents

Data Handbook System C2

Contents C3

Electrolytic capacitors; solid and non–solid:
2222 085 (surface mounting) C4
2222 117 .... C5
2222 021 .... C6
2222 030/031/032/033/041/042/043 .... C8
2222 065 .... C12
2222 108 .... C13
2222 132/133 .... C14
2222 118 .... C16
2222 119 .... C19
2222 037 .... C21
2222 036 .... C23
2222 035 .... C25
2222 044 .... C27
2222 013 .... C30
2222 116 .... C31
2222 054/055 .... C32
2222 051/053 .... C33
2222 050/052 .... C34
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Solid aluminium capacitors:
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2222 330 (MKT–P) C45

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2222 344 (MKT and MKC) C46
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Polypropylene film/foil capacitors:
2222 460–464 (KP) C62

Polystyrene film/foil capacitors:
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A.C. and pulse metallized
polypropylene film capacitors:
2222 376 (KP/MMKP) C65
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Ceramic multilayer capacitors
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2222/2238 808 2 (5 mm) C86
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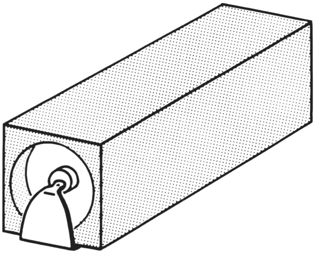
CECC approved types C92

2222 085 (surface mounting)

For detailed information on these and other types see Data Handbook C14
For packing information see page C37/C38

Nominal capacitance range (E3–series)	0.1 to 22 μF
Lower tolerance on nominal capacitance	−10%
Upper tolerance on nominal capacitance	+50%
Rated voltage range, U_R (R5–series)	6.3 to 63 V
Minimum category temperature	−40 °C
Maximum category temperature	+85 °C
Endurance test at 85 °C	1000 h
Shelf life at 0 V, 85 °C	500 h
Basic specification	IEC 384–4
Climatic category	40/085/56

case size	nominal dimensions (mm) length x width x height
1a	8.8 x 3.7 x 3.9
1	11.9 x 3.7 x 3.9



U_R V	C_{nom} μF	case size	cat. number capacitors in rail	cat. number capacitors in tape
6.3	10	1a	**2222 085 33109**	**2222 085 23109**
	22	1	**2222 085 33229**	**2222 085 23229**
10	6.8	1a	**2222 085 34688**	**2222 085 24688**
	15	1	**2222 085 34159**	**2222 085 24159**
16	4.7	1a	**2222 085 35478**	**2222 085 25478**
	10	1	**2222 085 35109**	**2222 085 25109**
25	3.3	1a	**2222 085 36338**	**2222 085 26338**
	6.8	1	**2222 085 36688**	**2222 085 26688**
40	2.2	1a	**2222 085 37228**	**2222 085 27228**
	4.7	1	**2222 085 37478**	**2222 085 27478**
63	0.1	1a	**2222 085 38107**	**2222 085 28107**
	0.22	1a	**2222 085 38227**	**2222 085 28227**
	0.47	1a	**2222 085 38477**	**2222 085 28477**
	1	1a	**2222 085 38108**	**2222 085 28108**
	2.2	1	**2222 085 38228**	**2222 085 28228**
	3.3	1	**2222 085 38338**	**2222 085 28338**

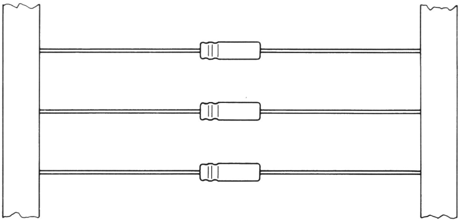
ELECTROLYTIC CAPACITORS; SOLID AND NON–SOLID

2222 117

For detailed information on these and other types see Data Handbook C14
For packing information see page C37/C38

Nominal capacitance range (E3–series)	0.1 to 22 μF
Lower tolerance on nominal capacitance	− 10%
Upper tolerance on nominal capacitance	+ 50%
Rated voltage range, U_R (R5–series)	6.3 to 63 V
Minimum category temperature	− 40 °C
Maximum category temperature	+ 85 °C
Endurance test at 85 °C	1500 h
Shelf life at 0 V, 85 °C	500 h
Basic specification	IEC 384–4
Climatic category	40/085/56

case size	nominal dimensions (mm)
1a	∅ 3.3 x 8
1	∅ 3.3 x 11



style 1

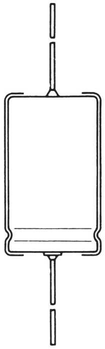
U_R V	C_{nom} μF	case size	cat. number style 1 on reel	
6.3	10	1a	**2222 117 23109**	
	22	1	**2222 117 23229**	
10	6.8	1a	**2222 117 24688**	
	15	1	**2222 117 24159**	
16	4.7	1a	**2222 117 25478**	
	10	1	**2222 117 25109**	
25	3.3	1a	**2222 117 26338**	
	6.8	1	**2222 117 26688**	
40	2.2	1a	**2222 117 27228**	
	4.7	1	**2222 117 27478**	
63	0.1	1a	**2222 117 28107**	
	0.22	1a	**2222 117 28227**	
	0.47	1a	**2222 117 28477**	
	1	1a	**2222 117 28108**	
	2.2	1	**2222 117 28228**	

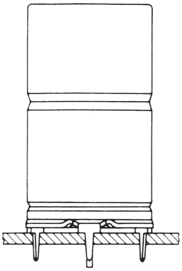
ELECTROLYTIC CAPACITORS; SOLID AND NON–SOLID Gen. data
2222 021

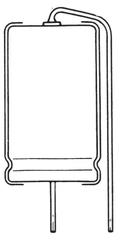
For detailed information on these and other types see Data Handbook C14
For packing information see page C37/C38

Nominal capacitance range (E3–series)	0.22 to 15000 µF
Lower tolerance on nominal capacitance	−20%
Upper tolerance on nominal capacitance	+20%
Rated voltage range, U_R	10 to 63 V
Minimum category temperature	−55 °C
Maximum category temperature	+85 °C
Endurance test at 85 °C	
case sizes 2 to 7	2000 h
case sies 00 to 05	5000 h
Shelf life at 0 V, 85 °C	500 h
Basic specification	IEC 384–4
Climatic category	55/085/56

case size	nominal dimensions (mm)
2	∅ 4.5 x 10
3	∅ 6 x 10
5a	∅ 8 x 11
4	∅ 6.5 x 18
5	∅ 8 x 18
6	∅ 10 x 18
7	∅ 10 x 25
00	∅ 10 x 30
01	∅ 12.5 x 30
02	∅ 15 x 30
03	∅ 18 x 30
04	∅ 18 x 40
05	∅ 21 x 40


style 1


style 2


style 3

U_R V	C_{nom} µF	case size	cat. number style 1 (case sizes 2 to 7 on reel)	cat. number style 2	cat. number style 3
10	100	2	**2222 021 24101**		
	220	3	**2222 021 24221**		
	330	5a	**2222 021 24331**		
	470	4	**2222 021 24471**		
	1000	6	**2222 021 24102**		
	1500	00	**2222 021 14152**		
	2200	01	**2222 021 14222**		
	6800	03	**2222 021 14682**		
	10000	04	**2222 021 14103**		
16	150	3	**2222 021 25151**		
	220	5a	**2222 021 25221**		
	470	5	**2222 021 25471**		
	1000	00	**2222 021 15102**		
	1000	7	**2222 021 90517**		
	1500	01	**2222 021 15152**		**2222 021 85152**
	2200	01	**2222 021 15222**		
	4700	03	**2222 021 15472**	**2222 021 45472**	
	6800	04		**2222 021 45682**	
	10000	05	**2222 021 15103**		

For detailed information on these and other types see Data Handbook C14
For packing information see page C37/C38

U_R V	C_{nom} µF	case size	cat. number style 1 (case sizes 2 to 7 on reel)	cat. number style 2	cat. number style 3
25	47	2	**2222 021 26479**		
	100	3	**2222 021 26101**		
	220	4	**2222 021 26221**		
	470	6	**2222 021 26471**		
	680	00	**2222 021 16681**		
	1000	01	**2222 021 16102**		
	1500	01	**2222 021 16152**		
	2200	02	**2222 021 16222**		
	3300	03	**2222 021 16332**		
	4700	04	**2222 021 16472**	**2222 021 46472**	
	6800	05	**2222 021 16682**		
40	22	2	**2222 021 27229**		
	47	3	**2222 021 27479**		
	100	4	**2222 021 27101**		
	220	6	**2222 021 27221**		
	330	7	**2222 021 27331**		
	470	00	**2222 021 17471**		**2222 021 87471**
	680	01	**2222 021 17681**		
	1000	01	**2222 021 17102**		**2222 021 87102**
	2200	03	**2222 021 17222**	**2222 021 47222**	
	3300	04	**2222 021 17332**		
	4700	05	**2222 021 17472**	**2222 021 47472**	
63	0.22	2	**2222 021 28227**		
	0.47	2	**2222 021 28477**		
	1	2	**2222 021 28108**		
	2.2	2	**2222 021 28228**		
	4.7	2	**2222 021 28478**		
	10	2	**2222 021 28109**		
	15	2	**2222 021 28159**		
	22	3	**2222 021 28229**		
	33	3	**2222 021 28339**		
	47	4	**2222 021 28479**		
	100	5	**2222 021 28101**		
	150	6	**2222 021 28151**		
	220	00	**2222 021 18221**		
	220	7	**2222 021 90511**		
	330	01	**2222 021 18331**		
	470	01	**2222 021 18471**		
	680	02	**2222 021 18681**		
	1000	03	**2222 021 18102**		
	1500	04	**2222 021 18152**		
	2200	05	**2222 021 18222**		

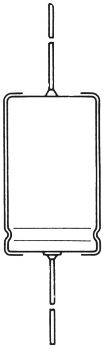
ELECTROLYTIC CAPACITORS; SOLID AND NON–SOLID Gen. data

2222 030/031/032/033/041/042/043

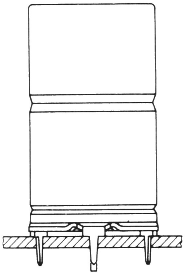
For detailed information on these and other types see Data Handbook C14
For packing information see page C37/C38

Nominal capacitance range (E6–series)	0.33 to 10000 μF
Lower tolerance on nominal capacitance	−10%
Upper tolerance on nominal capacitance	+10%
Rated voltage range, U_R	6.3 to 385 V
Minimum category temperature	−40, −55 °C
Maximum category temperature	+85 °C
Endurance test at 85 °C	
case sizes 2 to 7	2000, 5000 h
case size 1	1000 h
Shelf life at 0 V, 85 °C	500 h
Basic specification	IEC 384–4
Climatic category	40/085/56, 55/085/56

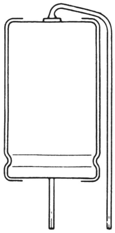
case size	nominal dimensions (mm)
2	∅ 4.5 x 10
3	∅ 6 x 10
5a	∅ 8 x 11
4	∅ 6.5 x 18
5	∅ 8 x 18
6	∅ 10 x 18
7	∅ 10 x 25
00	∅ 10 x 30
01	∅ 12.5 x 30
02	∅ 15 x 30
03	∅ 18 x 30
04	∅ 18 x 40
05	∅ 21 x 40



style 1



style 2



style 3

U_R V	C_{nom} μF	case size	cat. number style 1 (case sizes 2 to 7 on reel)	cat. number style 1 ammo pack	cat. number style 2	cat. number style 3
6.3	33	2	**2222 030 23339**			
	68	2	**2222 030 23689**	**2222 031 33689**		
	150	3	**2222 030 23151**	**2222 031 33151**		
	470	5	**2222 031 23471**	**2222 031 33471**		
	680	6	**2222 031 23681**	**2222 031 33681**		
	1000	7	**2222 031 23102**	**2222 031 33102**		
10	22	2	**2222 030 24229**	**2222 031 34229**		
	47	2	**2222 030 24479**	**2222 031 34479**		
	100	3	**2222 030 24101**	**2222 031 34101**		
	220	4	**2222 031 24221**	**2222 031 34221**		
	220	5a	**2222 030 24221**			
	330	5	**2222 031 24331**	**2222 031 34331**		
	470	6	**2222 031 24471**	**2222 031 34471**		
	1000	00	**2222 032 14102**			
	1500	01	**2222 032 14152**			
	2200	02	**2222 032 14222**			
	4700	04			**2222 033 44472**	
	6800	05	**2222 033 14682**			
	10000	05	**2222 033 14103**			

For detailed information on these and other types see Data Handbook C14
For packing information see page C37/C38

U_R V	C_{nom} µF	case size	cat. number style 1 (case sizes 2 to 7 on reel)	cat. number style 1 ammo pack	cat. number style 2	cat. number style 3
16	15	2	**2222 030 25159**	**2222 030 35159**		
	33	2	**2222 030 25339**	**2222 030 35339**		
	68	3	**2222 030 25689**	**2222 030 35689**		
	150	5a	**2222 030 25151**	**2222 030 35151**		
	220	5	**2222 031 25221**	**2222 031 35221**		
	330	6	**2222 031 25331**	**2222 031 35331**		
	470	7	**2222 031 25471**	**2222 031 35471**		
	680	00	**2222 032 25681**			
	1000	01	**2222 032 15102**			
	1500	02	**2222 032 15152**			
	2200	03	**2222 032 15222**			
	4700	05	**2222 033 15472**			
25	10	2	**2222 030 26109**	**2222 030 36109**		
	22	2	**2222 030 26229**	**2222 030 36229**		
	47	3	**2222 030 26479**	**2222 030 36479**		
	100	4	**2222 031 26101**	**2222 031 36101**		
	220	6	**2222 031 26221**	**2222 031 36221**		
	470	00	**2222 032 16471**			
	680	01	**2222 032 16681**			
	1000	02	**2222 032 16102**			
	1500	03	**2222 032 16152**			
	2200	04	**2222 033 16222**			
	3300	05	**2222 033 16332**			
	4700	05	**2222 033 16472**		**2222 033 46472**	
40	6.8	2	**2222 030 27688**	**2222 030 37688**		
	10	2	**2222 030 27109**	**2222 030 37109**		
	15	2	**2222 030 27159**	**2222 030 37159**		
	22	3	**2222 030 27229**	**2222 030 37229**		
	33	3	**2222 030 27339**	**2222 030 37339**		
	47	4	**2222 031 27479**	**2222 031 37479**		
	100	5	**2222 031 27101**	**2222 031 37101**		
	150	6	**2222 031 27151**	**2222 031 37151**		
	220	00	**2222 032 17221**			
	220	7	**2222 031 27221**	**2222 031 37221**		
	470	01	**2222 032 17471**			**2222 032 87471**
	680	02	**2222 032 17681**			
	1000	03	**2222 032 17102**			
	1500	04	**2222 033 17152**			
	2200	05	**2222 033 17222**		**2222 033 47222**	
	3300	05	**2222 033 17332**			

For detailed information on these and other types see Data Handbook C14
For packing information see page C37/C38

U_R V	C_{nom} µF	case size	cat. number style 1 (case sizes 2 to 7 on reel)	cat. number style 1 ammo pack	cat. number style 2	cat. number style 3
63	0.33	2	**2222 030 28337**	**2222 030 38337**		
	0.47	2	**2222 030 28477**	**2222 030 38477**		
	0.68	2	**2222 030 28687**	**2222 030 38687**		
	1	2	**2222 030 28108**	**2222 030 38108**		
	1.5	2	**2222 030 28158**	**2222 030 38158**		
	2.2	2	**2222 030 28228**	**2222 030 38228**		
	3.3	2	**2222 030 28338**	**2222 030 38338**		
	4.7	2	**2222 030 28478**	**2222 030 38478**		
	6.8	2	**2222 030 28688**	**2222 030 38688**		
	10	3	**2222 030 28109**	**2222 030 38109**		
	15	3	**2222 030 28159**	**2222 030 38159**		
	22	4	**2222 031 28229**	**2222 031 38229**		
	22	5a	**2222 030 28229**	**2222 030 38229**		
	47	5	**2222 031 28479**	**2222 031 38479**		
	68	6	**2222 031 28689**	**2222 031 38689**		
	100	7	**2222 031 28101**	**2222 031 38101**		
	150	00	**2222 032 18151**			
	220	01	**2222 032 18221**			
	330	02	**2222 032 18331**			
	470	02	**2222 032 18471**			
	680	03	**2222 032 18681**			
	1000	05	**2222 033 18102**			
100	2.2	2	**2222 030 29228**	**2222 030 39228**		
	4.7	3	**2222 030 29478**	**2222 030 39478**		
	10	4	**2222 031 29109**	**2222 031 39101**		
	22	5	**2222 031 29229**	**2222 031 39229**		
	33	6	**2222 031 29339**	**2222 031 39339**		
	47	7	**2222 031 29479**	**2222 031 39479**		**2222 031 89479**
	68	00	**2222 032 19689**			
	100	01	**2222 032 19101**			
	220	03	**2222 032 19221**			
	470	05	**2222 033 19471**			
	680	05	**2222 033 19681**			
160	4.7	4	**2222 041 21478**	**2222 041 31478**		**2222 041 81478**
	10	5	**2222 041 21109**	**2222 041 31109**		**2222 041 81109**
	22	00	**2222 042 11229**			
	22	7	**2222 041 21229**	**2222 041 31229**		**2222 041 81229**
	47	02	**2222 042 11479**			
	100	03	**2222 042 11101**		**2222 042 41101**	**2222 042 81101**
	220	05	**2222 043 11221**			

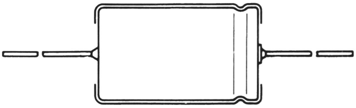
For detailed information on these and other types see Data Handbook C14
For packing information see page C37/C38

U_R V	C_{norn} µF	case size	cat. number style 1 (case sizes 2 to 7 on reel)	cat. number style 1 ammo pack	cat. number style 2	cat. number style 3
250	2.2	4	**2222 041 23228**	**2222 041 33228**		**2222 041 83228**
	4.7	5	**2222 041 23478**	**2222 041 33478**		**2222 041 83478**
	10	00	**2222 042 13109**			**2222 042 83109**
	10	7	**2222 041 23109**	**2222 041 33109**		**2222 041 83109**
	22	01	**2222 042 13229**			**2222 042 83229**
	47	03	**2222 042 13479**		**2222 042 43479**	
	100	05	**2222 043 13101**		**2222 043 43101**	
350	4.7	6	**2222 041 25478**	**2222 041 35478**		**2222 041 85478**
	6.8	00				**2222 042 85688**
	10	01	**2222 042 15109**			
	22	02	**2222 042 15229**			
	47	04	**2222 043 15479**			
385	1	4	**2222 041 28108**	**2222 041 38108**		**2222 041 88108**
	2.2	5	**2222 041 28228**	**2222 041 38228**		**2222 041 88228**
	4.7	7	**2222 041 28478**	**2222 041 38478**		**2222 041 88478**
	6.8	00	**2222 042 18688**			
	10	01	**2222 042 18109**			**2222 042 88109**
	22	03	**2222 042 18229**		**2222 042 48229**	
	47	04	**2222 043 18479**		**2222 043 48479**	
	68	05	**2222 043 18689**		**2222 043 48689**	

For detailed information on these and other types see Data Handbook C14
For packing information see page C37/C38

Nominal capacitance range (E3–series)	0.47 to 47 μF
Lower tolerance on nominal capacitance	−10, −20%
Upper tolerance on nominal capacitance	+50, +20%
Rated voltage range, U_R	10 to 25 V
Leakage current after 2 min	0.7 to 1.1 μA
Minimum category temperature	−55 °C
Maximum category temperature	+85 °C
Endurance test at 85 °C	2000 h
Shelf life at 0 V, 85 °C	500 h
Basic specification	IEC 384–4
Climatic category	55/085/56

case size	nominal dimensions (mm)
2	∅ 4.5 x 10
3	∅ 6.0 x 10



U_R V	C_{nom} μF	case size	cat. number on reel −10/+50%	cat. number on reel ±20%
10	10	2	**2222 065 24109**	**2222 065 64109**
	22	2	**2222 065 24229**	**2222 065 64229**
	47	3	**2222 065 24479**	**2222 065 64479**
16	10	2	**2222 065 25109**	**2222 065 65109**
	22	3	**2222 065 25229**	**2222 065 65229**
	33	3	**2222 065 25339**	**2222 065 65339**
25	0.47	2	**2222 065 26477**	**2222 065 66477**
	1	2	**2222 065 26108**	**2222 065 66108**
	2.2	2	**2222 065 26228**	**2222 065 66228**
	4.7	2	**2222 065 26478**	**2222 065 66478**
	10	3	**2222 065 26109**	**2222 065 66109**

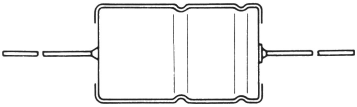
ELECTROLYTIC CAPACITORS; SOLID AND NON–SOLID Gen. data
2222 108

For detailed information on these and other types see Data Handbook C14
For packing information see page C37/C38

Nominal capacitance range (E6–series)	2.2 to 1500 μF
Lower tolerance on nominal capacitance	−10%
Upper tolerance on nominal capacitance	+50%
Rated voltage range, U_R	10 to 100 V
Minimum category temperature	−40 °C
Maximum category temperature	+85 °C
Endurance test at 85 °C, 105°C	5000 h, 1000 h*
Shelf life at 0 V, 85 °C	500 h
Basic specification	IEC 384–4
Climatic category	40/085/56

* not applicable to 100 V range

case size	nominal dimensions (mm)
5	Ø 8 x 18
6	Ø 10 x 18
00	Ø 10 x 30
01	Ø 12.5 x 30
02	Ø 15 x 30
03	Ø 18 x 30



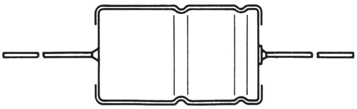
U_R V	C_{nom} μF	case size	cat. number
10	100	5	**2222 108 34101**
	220	6	**2222 108 34221**
	330	00	**2222 108 34331**
	680	01	**2222 108 34681**
	1000	02	**2222 108 34102**
	1500	03	**2222 108 34152**
16	68	5	**2222 108 35689**
	150	6	**2222 108 35151**
	220	00	**2222 108 35221**
	470	01	**2222 108 35471**
	680	02	**2222 108 35681**
	1000	03	**2222 108 35102**
25	33	5	**2222 108 36339**
	47	5	**2222 108 36479**
	100	6	**2222 108 36101**
	150	00	**2222 108 36151**
	220	01	**2222 108 36221**
	470	02	**2222 108 36471**
	680	03	**2222 108 36681**
40	15	5	**2222 108 37159**
	22	5	**2222 108 37229**
	33	6	**2222 108 37339**
	47	6	**2222 108 37479**
	68	00	**2222 108 37689**
	100	01	**2222 108 37101**
40	150	01	**2222 108 37151**
	220	02	**2222 108 37221**
	330	03	**2222 108 37331**
63	2.2	5	**2222 108 38228**
	3.3	5	**2222 108 38338**
	4.7	5	**2222 108 38478**
	6.8	5	**2222 108 38688**
	10	5	**2222 108 38109**
	15	6	**2222 108 38159**
	22	6	**2222 108 38229**
	33	00	**2222 108 38339**
	47	00	**2222 108 38479**
	68	01	**2222 108 38689**
	100	02	**2222 108 38101**
	150	03	**2222 108 38151**
100	4.7	5	**2222 108 39478**
	6.8	5	**2222 108 39688**
	10	5	**2222 108 39109**
	15	6	**2222 108 39159**
	22	6	**2222 108 39229**
	100	02	**2222 108 39101**

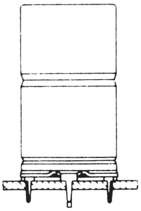
ELECTROLYTIC CAPACITORS; SOLID AND NON–SOLID Gen. data
2222 132/133

For detailed information on these and other types see Data Handbook C14
For packing information see page C37/C38

Nominal capacitance range (E3–series)	1 to 4700 µF
Lower tolerance on nominal capacitance	−10%
Upper tolerance on nominal capacitance	+50%
Rated voltage range, U_R (R5–series)	10 to 350 V
Minimum category temperature	−40, −55 °C
Maximum category temperature	+85 °C
Endurance test at 85 °C	
case sizes 4 and 5	6000 h
case sizes 6 to 05	8000 h
Shelf life at 0 V, 85 °C	500 h
Basic specification	IEC 384–4
Climatic category	40/085/56, 55/085/56

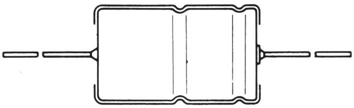
case size	nominal dimensions (mm)
4	∅ 6.5 x 18
5	∅ 8 x 18
6	∅ 10 x 18
7	∅ 10 x 25
00	∅ 10 x 30
01	∅ 12.5 x 30
02	∅ 15 x 30
03	∅ 18 x 30
04	∅ 18 x 40
05	∅ 21 x 40


style 1

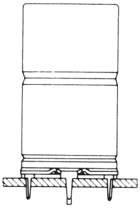

style 2

U_R V	C_{nom} µF	case size	cat. number style 1 on bandoliers on reel	cat. number style 1 on bandoliers in box	cat. number style 1 in box	cat. number style 2 in box
10	220	5	**2222 132 24221**	**2222 132 34221**		
	2200	03			**2222 132 14222**	
16	47	4	**2222 132 25479**	**2222 132 35479**		
	68	4	**2222 132 25689**	**2222 132 35689**		
	100	5	**2222 132 25101**	**2222 132 35101**		
	220	6	**2222 132 25221**	**2222 132 35221**		
	470	7	**2222 132 90507**	**2222 132 90502**		
	470	01			**2222 132 15471**	
	1000	02			**2222 132 15102**	**2222 132 45102**
	2200	04			**2222 132 15222**	**2222 132 45222**
	4700	05			**2222 132 15472**	**2222 132 45472**

For detailed information on these and other types see Data Handbook C14
For packing information see page C37/C38



style 1



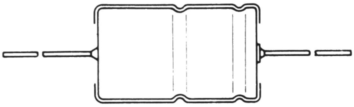
style 2

U_R V	C_{nom} µF	case size	cat. number style 1 on bandoliers on reel	cat. number style 1 on bandoliers in box	cat. number style 1 in box	cat. number style 2 in box
25	22	4	**2222 132 26229**	**2222 132 36229**		
	220	7	**2222 132 90503**	**2222 132 90504**		
	220	01			**2222 132 16221**	
	470	01			**2222 132 16471**	
	1000	03			**2222 132 16102**	
	2200	05			**2222 132 16222**	
40	33	5	**2222 132 27339**	**2222 132 27479**		
	47	5	**2222 132 27479**	**2222 132 37479**		
	100	6	**2222 132 27101**	**2222 132 37101**		
	470	02			**2222 132 17471**	
	1000	04			**2222 132 17102**	
	2200	05			**2222 132 17222**	
63	4.7	4	**2222 132 28478**	**2222 132 38478**		
	10	4	**2222 132 28109**	**2222 132 38109**		
	22	5	**2222 132 28229**	**2222 132 38229**		
	47	6	**2222 132 28479**	**2222 132 38479**		
	100	00			**2222 132 18101**	
	220	02			**2222 132 18221**	
	1000	05			**2222 132 18102**	
100	1	4	**2222 132 29108**	**2222 132 39108**		
	2.2	4	**2222 132 29228**	**2222 132 39228**		
	4.7	4	**2222 132 29478**	**2222 132 39478**		
	10	5	**2222 132 29109**	**2222 132 39109**		
	22	6	**2222 132 29229**	**2222 132 39229**		
	47	7	**2222 132 90505**	**2222 132 90506**		
	47	00			**2222 132 19479**	
	100	02			**2222 132 19101**	
	220	04			**2222 132 19221**	
	470	05			**2222 132 19471**	

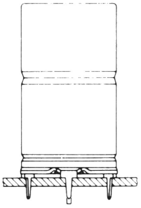
ELECTROLYTIC CAPACITORS; SOLID AND NON–SOLID Gen. data

2222 132/133 (cont.)

For detailed information on these and other types see Data Handbook C14
For packing information see page C37/C38



style 1



style 2

U_R V	C_{nom} µF	case size	cat. number style 1 on bandoliers on reel	cat. number style 1 on bandoliers in box	cat. number style 1 in box	cat. number style 2 in box
160	2.2	4	**2222 133 21228**	**2222 133 31228**		
	4.7	5	**2222 133 21478**	**2222 133 31478**		
	10	6	**2222 133 21109**	**2222 133 31109**		
	22	7	**2222 133 90502**	**2222 133 90503**		
	220	05			**2222 133 11221**	
250	2.2	5	**2222 133 23228**	**2222 133 33228**		
	4.7	6	**2222 133 23478**	**2222 133 33478**		
	10	7	**2222 133 23109**	**2222 133 33109**		
	22	01			**2222 133 13229**	
	100	05			**2222 133 13101**	
350	1	4	**2222 133 25108**	**2222 133 35108**		
	2.2	5	**2222 133 25228**	**2222 133 35228**		
	4.7	6	**2222 133 25478**	**2222 133 35478**		
	22	02			**2222 133 15229**	

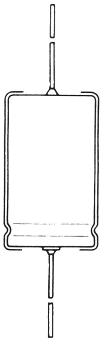
ELECTROLYTIC CAPACITORS; SOLID AND NON–SOLID Gen. data

2222 118

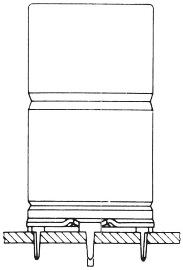
For detailed information on these and other types see Data Handbook C14
For packing information see page C37/C38

Nominal capacitance range (E3–series)	1 to 10000 μF
Lower tolerance on nominal capacitance	−20%
Upper tolerance on nominal capacitance	+20%
Rated voltage range, U_R	6.3 to 63 V
Minimum category temperature	−40, −55 °C
Maximum category temperature	+125 °C
Endurance test at 125 °C	2000 h
Shelf life at 0 V, 125 °C	500 h
Basic specification	IEC 384–4
Climatic category case sizes 4 to 7	40/125/56
Climatic category case sizes 00 to 05	55/125/56

case size	nominal dimensions (mm)
4	∅ 6.5 x 18
5	∅ 8 x 18
6	∅ 10 x 18
7	∅ 10 x 25
00	∅ 10 x 30
01	∅ 12.5 x 30
02	∅ 15 x 30
03	∅ 18 x 30
04	∅ 18 x 40
05	∅ 21 x 40



style 1



style 2

U_R V	C_{nom} μF	case size	cat. number style 1 on reel case sizes 4 to 7	cat. number style 2	cat. number style 1 ammopack
6.3	1000	6	**2222 118 23102**		**2222 118 33102**
10	220	4	**2222 118 24221**		**2222 118 34221**
	470	5	**2222 118 24471**		**2222 118 34471**
	1000	7	**2222 118 90504**		**2222 118 90505**
	4700	03	**2222 118 14472**		

For detailed information on these and other types see Data Handbook C14
For packing information see page C37/C38

U_R V	C_{nom} µF	case size	cat. number style 1 on reel case sizes 4 to 7	cat. number style 2	cat. number style 1 ammopack
16	220	5	**2222 118 25221**		**2222 118 35221**
	470	6	**2222 118 25471**		**2222 118 35471**
	1000	01	**2222 118 15102**		
	2200	02	**2222 118 15222**	**2222 118 45222**	
25	100	4	**2222 118 26101**		**2222 118 36101**
	220	6	**2222 118 26221**		**2222 118 36221**
	470	7	**2222 118 90508**		**2222 118 90509**
	470	00	**2222 118 16471**		
	1000	01	**2222 118 16102**		
40	47	4	**2222 118 27479**		**2222 118 37479**
	100	5	**2222 118 27101**		**2222 118 37101**
	220	7	**2222 118 90511**		**2222 118 90512**
	220	00	**2222 118 17221**		
	470	01	**2222 118 17471**		
	1000	03	**2222 118 17102**	**2222 118 47102**	
	2200	05	**2222 118 17222**	**2222 118 47222**	
63	1	4	**2222 118 28108**		**2222 118 38108**
	2,2	4	**2222 118 28228**		**2222 118 38228**
	4,7	4	**2222 118 28478**		**2222 118 38478**
	10	4	**2222 118 28109**		**2222 118 38109**
	22	4	**2222 118 28229**		**2222 118 38229**
	47	5	**2222 118 28479**		**2222 118 38479**
	100	7	**2222 118 90513**		**2222 118 90514**
	100	00	**2222 118 18101**		
	220	01	**2222 118 18221**		
	470	03		**2222 118 48471**	

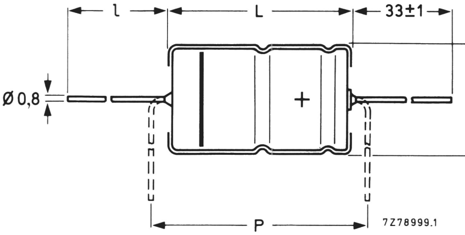
ELECTROLYTIC CAPACITORS; SOLID AND NON–SOLID Gen. data

2222 119

For detailed information on these and other types see Data Handbook C14
For packing information see page C37/C38

Nominal capacitance range (E3–series)	1 to 4700 µF
Lower tolerance on nominal capacitance	−10%
Upper tolerance on nominal capacitance	+50%
Rated voltage range, U_R	10 to 63 V
Minimum category temperature	−55 °C
Maximum category temperature	+125 °C
Endurance test at 125 °C	2000 h
Shelf life at 0 V, 125 °C	500 h
Basic specification	IEC 384–4
Climatic category	55/125/56

case size	nominal dimensions (mm)
4	Ø 6.5 x 18
5	Ø 8 x 18
6	Ø 10 x 18
7	Ø 10 x 25
00	Ø 10 x 30
01	Ø 12.5 x 30
02	Ø 15 x 30
03	Ø 18 x 30
04	Ø 18 x 40
05	Ø 21 x 40



U_R V	C_{nom} µF	case size	cat number case sizes 00–05 in box	cat number case sizes 4–7 on bandoliers on reel	cat number case sizes 4–7 ammopack	cat number case sizes 02–05
10	100	4		**2222 119 24101**	**2222 119 34101**	
	220	6		**2222 119 24221**	**2222 119 34221**	
	330	7		**2222 119 24331**	**2222 119 34331**	
	470	7		**2222 119 90501**	**2222 119 90502**	
	470	01	**2222 119 14471**			
	680	01	**2222 119 14681**			
	1500	03	**2222 119 14152**			**2222 119 44152**
	3300	04	**2222 119 14332**			**2222 119 44332**
	4700	05	**2222 119 14472**			**2222 119 44472**
16	47	4		**2222 119 25479**	**2222 119 35479**	
	100	5		**2222 119 25101**	**2222 119 35101**	
	150	6		**2222 119 25151**	**2222 119 35151**	
	220	7		**2222 119 25221**	**2222 119 35221**	
	330	01	**2222 119 15331**			
	470	01	**2222 119 15471**			
	680	02	**2222 119 15681**			**2222 119 45681**
	1500	03	**2222 119 15152**			**2222 119 45152**
	2200	04				**2222 119 45222**
	3300	05	**2222 119 15332**			**2222 119 45332**

For detailed information on these and other types see Data Handbook C14
For packing information see page C37/C38

U_R V	C_{nom} µF	case size	cat number case sizes 00–05 in box	cat number case sizes 4–7 on bandoliers on reel	cat number case sizes 4–7 ammopack	cat number case sizes 02–05
25	22	4		**2222 119 26229**	**2222 119 36229**	
	100	6		**2222 119 26101**	**2222 119 36101**	
	150	7		**2222 119 26151**	**2222 119 36151**	
	220	7		**2222 119 90503**	**2222 119 90504**	
	330	01	**2222 119 16331**			
	680	03	**2222 119 16681**			**2222 119 46681**
40	15	4		**2222 119 27159**	**2222 119 37159**	
	33	5		**2222 119 27339**	**2222 119 37339**	
	47	5		**2222 119 27479**	**2222 119 37479**	
	68	6		**2222 119 27689**	**2222 119 37689**	
	100	7		**2222 119 27101**	**2222 119 37101**	
	150	01	**2222 119 17151**			
	330	02	**2222 119 17331**			**2222 119 47331**
	470	02	**2222 119 17471**			**2222 119 47471**
	680	03	**2222 119 17681**			**2222 119 47681**
	1000	04				**2222 119 47102**
	2200	05	**2222 119 17222**			**2222 119 47222**
63	1	4		**2222 119 28108**	**2222 119 38108**	
	1.5	4		**2222 119 28158**	**2222 119 38158**	
	2.2	4		**2222 119 28228**	**2222 119 38228**	
	3.3	4		**2222 119 28338**	**2222 119 38338**	
	4.7	4		**2222 119 28478**	**2222 119 38478**	
	6.8	4		**2222 119 28688**	**2222 119 38688**	
	10	4		**2222 119 28109**	**2222 119 38109**	
	15	5		**2222 119 28159**	**2222 119 38159**	
	22	5		**2222 119 28229**	**2222 119 38229**	
	33	6		**2222 119 28339**	**2222 119 38339**	
	47	6		**2222 119 28479**	**2222 119 38479**	
	68	7		**2222 119 90505**	**2222 119 90505**	
	150	02	**2222 119 18151**			**2222 119 48151**
	330	03	**2222 119 18331**			**2222 119 48331**
	680	05	**2222 119 18681**			**2222 119 48681**

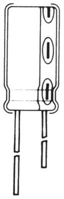
ELECTROLYTIC CAPACITORS; SOLID AND NON-SOLID Gen. data

2222 037

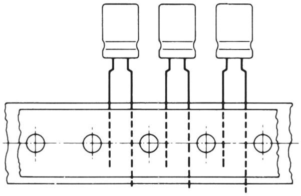
For detailed information on these and other types see Data Handbook C14
For packing information see page C37/C38

Nominal capacitance range (E3–series)	0.1 to 10000 μF
Lower tolerance on nominal capacitance	−20%
Upper tolerance on nominal capacitance	+20%
Rated voltage range, U_R	6.3 to 63 V
Minimum category temperature	−40 °C
Maximum category temperature	+85 °C
Endurance test at 85 °C	1000, 2000 h
Shelf life at 0 V, 85 °C	500 h
Basic specification	IEC 384–4
Climatic category	40/085/56

case size	nominal dimensions (mm)
11	∅ 5 x 11
12	∅ 6.3 x 11
13	∅ 8 x 12
14	∅ 10 x 12
15	∅ 10 x 16
16	∅ 10 x 20
17	∅ 12.5 x 20
18	∅ 12.5 x 25
19	∅ 16 x 25
20	∅ 16 x 31



style 1



style 4

C

U_R V	C_{nom} μF	case size	cat. number style 1 in box	cat. number style 4 on reel
6.3	220	12		**2222 037 23221**
	470	13		**2222 037 23471**
	2200	17	**2222 037 53222**	
	10000	20	**2222 037 53103**	
10	47	11		**2222 037 24479**
	100	11		**2222 037 24101**
	220	13		**2222 037 24221**
	1000	15	**2222 037 54102**	
	4700	19	**2222 037 54472**	
16	100	12		**2222 037 25101**
	220	13		**2222 037 25221**
	470	14	**2222 037 55471**	
	1000	16	**2222 037 55102**	
	2200	18	**2222 037 55222**	
	4700	20	**2222 037 55472**	

For detailed information on these and other types see Data Handbook C14
For packing information see page C37/C38

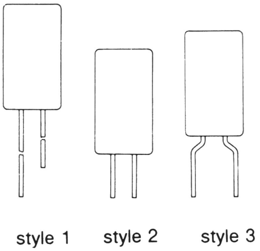
U_R V	C_{nom} µF	case size	cat. number styles 1 in box	cat. number style 4 on reel
25	47	11		**2222 037 26479**
	100	13		**2222 037 26101**
	1000	17	**2222 037 56102**	
	2200	19	**2222 037 56222**	
35	22	11		**2222 037 20229**
	220	14	**2222 037 50221**	
	470	16	**2222 037 50471**	
	1000	18	**2222 037 50102**	
	2200	20	**2222 037 50222**	
40	22	11		**2222 037 27229**
	47	12		**2222 037 27479**
	100	13		**2222 037 27101**
	470	17	**2222 037 57471**	
	1000	19	**2222 037 57102**	
50	10	11		**2222 037 21109**
	22	12		**2222 037 21229**
	47	13		**2222 037 21479**
	220	15	**2222 037 51221**	
	470	17	**2222 037 51471**	
	1000	19	**2222 037 51102**	
63	0.1	11		**2222 037 28107**
	0.22	11		**2222 037 28227**
	0.47	11		**2222 037 28477**
	1	11		**2222 037 28108**
	2.2	11		**2222 037 28228**
	4.7	11		**2222 037 28478**
	10	11		**2222 037 28109**
	22	12		**2222 037 28229**
	47	13		**2222 037 28479**
	100	14	**2222 037 58101**	
	220	16	**2222 037 58221**	
	470	18	**2222 037 58471**	
	1000	20	**2222 037 58102**	

ELECTROLYTIC CAPACITORS; SOLID AND NON–SOLID Gen. data
2222 036

For detailed information on these and other types see Data Handbook C14
For low–leakage version see 2222 013; for high temperature version see 2222 116
For packing information see page C37/C38

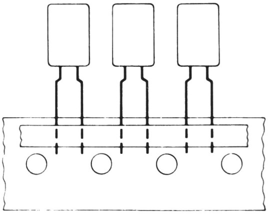
Nominal capacitance range (E3–series)	0.22 to 470 µF
Lower tolerance on nominal capacitance	−20%
Upper tolerance on nominal capacitance	+20%
Rated voltage range, U_R (R5–series)	6.3 to 63 V
Minimum category temperature	−55 °C
Maximum category temperature	+85 °C
Endurance test at 85 °C	2000 h
Shelf life at 0 V, 85 °C	500 h
Basic specification	IEC 384–4
Climatic category	55/085/56

case size	nominal dimensions (mm)
11	Ø 5 x 11
13	Ø 8.2 x 11



U_R V	C_{nom} µF	case size	cat. number style 1 in box	cat. number style 2 in box	cat. number style 3 in box
6.3	100	11	**2222 036 53101**	**2222 036 83101**	**2222 036 63101**
10	47	11	**2222 036 54479**	**2222 036 84479**	**2222 036 64479**
	220	13	**2222 036 54221**	**2222 036 64221**	
	470	13	**2222 036 54471**	**2222 036 64471**	
16	33	11	**2222 036 55339**	**2222 036 85339**	**2222 036 65339**
	100	11	**2222 036 55101**	**2222 036 85101**	**2222 036 65101**
	220	13	**2222 036 55221**	**2222 036 65221**	
	330	13	**2222 036 55331**	**2222 036 65331**	
25	68	11	**2222 036 56689**	**2222 036 86889**	**2222 036 66689**
25	100	13	**2222 036 56101**	**2222 036 66101**	
	220	13	**2222 036 56221**	**2222 036 66221**	
35	22	11	**2222 036 90001**	**2222 036 90002**	**2222 036 90003**
	47	11	**2222 036 90094**	**2222 036 90095**	**2222 036 90096**
50	10	11	**2222 036 90004**	**2222 036 90005**	**2222 036 90006**
	47	13	**2222 036 90011**	**2222 036 90012**	
	100	13	**2222 036 90109**	**2222 036 90111**	
63	0.22	11	**2222 036 58227**	**2222 036 88227**	**2222 036 68227**
	0.47	11	**2222 036 58477**	**2222 036 88477**	**2222 036 68477**
	1	11	**2222 036 58108**	**2222 036 88108**	**2222 036 68108**
	2.2	11	**2222 036 58228**	**2222 036 88228**	**2222 036 68228**
	4.7	11	**2222 036 58478**	**2222 036 88478**	**2222 036 68478**
	6.8	11	**2222 036 58688**	**2222 036 88688**	**2222 036 68688**
	10	11	**2222 036 58109**	**2222 036 88109**	**2222 036 68109**
	22	11	**2222 036 58229**	**2222 036 88229**	**2222 036 68229**
	47	13	**2222 036 58479**	**2222 036 68479**	

For detailed information on these and other types see Data Handbook C14
For low–leakage version see 2222 013; for high temperature version see 2222 116
For packing information see page C37/C38



styles 4 and 5

U_R V	C_{nom} µF	case size	cat. number style 4 on reel	cat. number style 5 in ammopack	
6.3	100	11	**2222 036 23101**	**2222 036 33101**	
10	47	11	**2222 036 24479**	**2222 036 34479**	
	220	13	**2222 036 24221**	**2222 036 34221**	
	470	13	**2222 036 24471**	**2222 036 34471**	
16	33	11	**2222 036 25339**	**2222 036 35339**	
	100	11	**2222 036 25101**	**2222 036 35101**	
	220	13	**2222 036 25221**	**2222 036 35221**	
	330	13	**2222 036 25331**	**2222 036 35331**	
25	68	11	**2222 036 26689**	**2222 036 36689**	
25	100	13	**2222 036 26101**	**2222 036 36101**	
	220	13	**2222 036 26221**	**2222 036 36221**	
35	22	11	**2222 036 90016**	**2222 036 90027**	
	47	11	**2222 036 90097**	**2222 036 90098**	
50	10	11	**2222 036 90017**	**2222 036 90028**	
	47	13	**2222 036 90019**	**2222 036 90031**	
	100	13	**2222 036 90112**	**2222 036 90113**	
63	0.22	11	**2222 036 28227**	**2222 036 38227**	
	0.47	11	**2222 036 28477**	**2222 036 38477**	
	1	11	**2222 036 28108**	**2222 036 38108**	
	2.2	11	**2222 036 28228**	**2222 036 38228**	
	4.7	11	**2222 036 28478**	**2222 036 38478**	
	6.8	11	**2222 036 28688**	**2222 036 38688**	
	10	11	**2222 036 28109**	**2222 036 38109**	
	22	11	**2222 036 28229**	**2222 036 38229**	
	47	13	**2222 036 28479**	**2222 036 38479**	

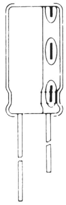
ELECTROLYTIC CAPACITORS; SOLID AND NON–SOLID

Gen. data
2222 035

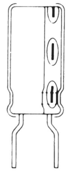
For detailed information on these and other types see Data Handbook C14
For packing information see page C37/C38

Nominal capacitance range (E3–series)	0.1 to 2200 µF
Lower tolerance on nominal capacitance	−20%
Upper tolerance on nominal capacitance	+20%
Rated voltage range, U_R	10 to 63 V
Minimum category temperature	−40 °C
Maximum category temperature	+85 °C
Endurance test at 85 °C	1000 h
Shelf life at 0 V, 85 °C	500 h
Basic specification	IEC 384–4
Climatic category	40/085/56

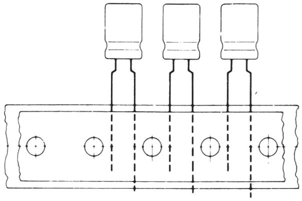
case size	nominal dimensions (mm)
11	∅ 5 x 11
12	∅ 6.3 x 11
13	∅ 8 x 12
14	∅ 10 x 12
15	∅ 10 x 16
16	∅ 10 x 20
17	∅ 12.5 x 20
18	∅ 12.5 x 25
19	∅ 16 x 25
20	∅ 16 x 31



style 1



style 3



style 4

U_R V	C_{nom} µF	case size	cat. number style 1 in box	cat. number style 3 in box	cat. number style 4 on reel
10	47	11	**2222 035 54479**	**2222 035 64479**	**2222 035 24479**
	100	12	**2222 035 54101**	**2222 035 64101**	**2222 035 24101**
	220	13	**2222 035 54221**	**2222 035 64221**	**2222 035 24221**
	470	15	**2222 035 54471**		
	1000	17	**2222 035 54102**		
16	220	14	**2222 035 55221**		
	470	16	**2222 035 55471**		
	1000	18	**2222 035 55102**		
	2200	19	**2222 035 55222**		

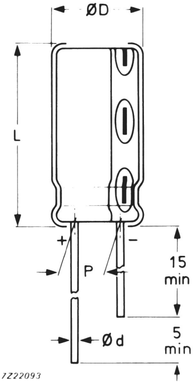
For detailed information on these and other types see Data Handbook C14
For packing information see page C37/C38

U_R V	C_{nom} µF	case size	cat. number style 1 in box	cat. number style 3 in box	cat. number style 4 on reel
25	47	12	**2222 035 56479**	**2222 035 66479**	**2222 035 26479**
	100	13	**2222 035 56101**	**2222 035 66101**	**2222 035 26101**
	220	15	**2222 035 56221**		
	470	17	**2222 035 56471**		
	1000	19	**2222 035 56102**		
	2200	20	**2222 035 56222**		
35	22	11	**2222 035 90003**	**2222 035 90005**	**2222 035 90034**
	100	14	**2222 035 90059**		
	1000	19	**2222 035 90006**		
40	22	12	**2222 035 57229**	**2222 035 67229**	**2222 035 27229**
	220	16	**2222 035 57221**		
	470	18	**2222 035 57471**		
50	10	11	**2222 035 90008**	**2222 035 90011**	**2222 035 90035**
	22	12	**2222 035 90012**	**2222 035 90014**	**2222 035 90036**
	47	13	**2222 035 90015**	**2222 035 90033**	**2222 035 90037**
	100	15	**2222 035 90019**		
	220	17	**2222 035 90024**		
	1000	20	**2222 035 90031**		
63	0.1	11	**2222 035 58107**	**2222 035 68107**	**2222 035 28107**
	0.15	11	**2222 035 58157**	**2222 035 68157**	**2222 035 28157**
	0.22	11	**2222 035 58227**	**2222 035 68227**	**2222 035 28227**
	0.47	11	**2222 035 58477**	**2222 035 68477**	**2222 035 28477**
	1	11	**2222 035 58108**	**2222 035 68108**	**2222 035 28108**
	2.2	11	**2222 035 58228**	**2222 035 68228**	**2222 035 28228**
	4.7	11	**2222 035 58478**	**2222 035 68478**	**2222 035 28478**
	10	12	**2222 035 58109**	**2222 035 68109**	**2222 035 28109**
	22	13	**2222 035 58229**	**2222 035 68229**	**2222 035 28229**
	47	14	**2222 035 58479**		
	100	16	**2222 035 58101**		
	220	18	**2222 035 58221**		
	470	19	**2222 035 58471**		

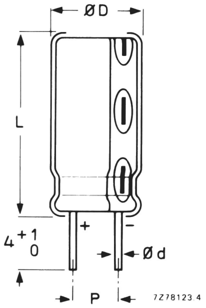
For detailed information on these and other types see Data Handbook C14
For packing information see page C37/C38

Nominal capacitance range (E6–series)	1 to 68 μF
Lower tolerance on nominal capacitance	−20%
Upper tolerance on nominal capacitance	+20%
Rated voltage range, U_R	160 to 385 V
Minimum category temperature	−25 °C
Maximum category temperature	+85 °C
Endurance test at 85 °C	2000 h
Shelf life at 0 V, 85 °C	500 h
Basic specification	IEC 384–4
Climatic category	25/085/56

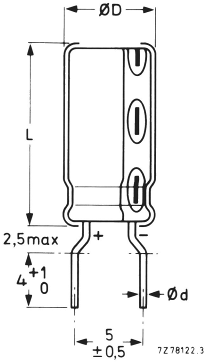
case size	nominal dimensions (mm)
13	Ø 8 x 12
14	Ø 10 x 12
15	Ø 10 x 16
16	Ø 10 x 20
17	Ø 12.5 x 20
18	Ø 12.5 x 25
19	Ø 16 x 25
20	Ø 16 x 31



style 1



style 2



style 3

U_R V	C_{nom} μF	case size	cat. number style 1 in box	cat. number style 2 in box	cat. number style 3
160	10	15	**2222 044 51109**	**2222 044 61109**	
	15	17	**2222 044 51159**	**2222 044 61159**	
	22	17	**2222 044 51229**	**2222 044 61229**	
	33	18	**2222 044 51339**	**2222 044 61339**	
	47	19	**2222 044 51479**	**2222 044 61479**	
	68	20	**2222 044 51689**	**2222 044 61689**	
200	4.7	14	**2222 044 52478**	**2222 044 62478**	
	6.8	15	**2222 044 52688**	**2222 044 62688**	
	10	16	**2222 044 52109**	**2222 044 62109**	
	15	17	**2222 044 52159**	**2222 044 62159**	
	22	17	**2222 044 52229**	**2222 044 62229**	
	33	18	**2222 044 52339**	**2222 044 62339**	
	47	19	**2222 044 52479**	**2222 044 62479**	
	68	20	**2222 044 52689**	**2222 044 62689**	

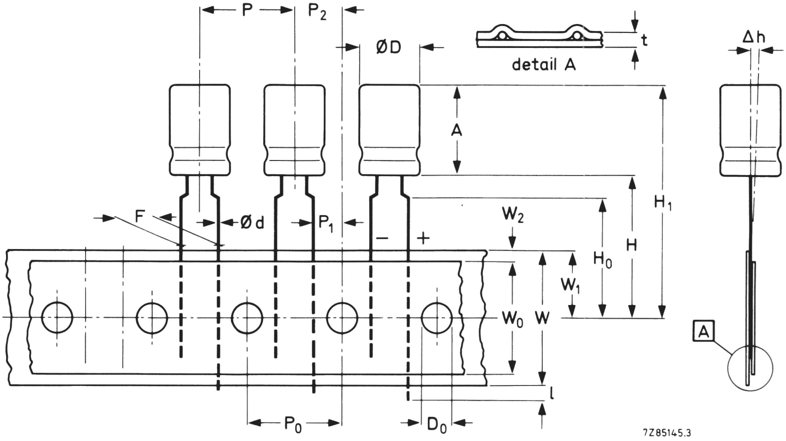
ELECTROLYTIC CAPACITORS; SOLID AND NON–SOLID

Gen. data
2222 044

For detailed information on these and other types see Data Handbook C14
For packing information see page C37/C38

U_R V	C_{nom} µF	case size	cat. number style 1 in box	cat. number style 2 in box	cat. number style 3
250	1	13	**2222 044 53108**	**2222 044 83108**	**2222 044 63108**
	1.5	13	**2222 044 53158**	**2222 044 83158**	**2222 044 63158**
	2.2	13	**2222 044 53228**	**2222 044 83228**	**2222 044 63228**
	3.3	14	**2222 044 53338**	**2222 044 63338**	
	4.7	15	**2222 044 53478**	**2222 044 63478**	
	6.8	16	**2222 044 53688**	**2222 044 63688**	
	10	17	**2222 044 53109**	**2222 044 63109**	
	15	17	**2222 044 53159**	**2222 044 63159**	
	22	18	**2222 044 53229**	**2222 044 63229**	
	33	19	**2222 044 53339**	**2222 044 63339**	
	47	20	**2222 044 53479**	**2222 044 63479**	
350	2.2	14	**2222 044 55228**	**2222 044 65228**	
	4.7	16	**2222 044 55478**	**2222 044 65478**	
	6.8	17	**2222 044 55688**	**2222 044 65688**	
	10	17	**2222 044 55109**	**2222 044 65109**	
	15	18	**2222 044 55159**	**2222 044 65159**	
	22	19	**2222 044 55229**	**2222 044 65229**	
	33	20	**2222 044 55339**	**2222 044 65339**	
385	1	13	**2222 044 58108**	**2222 044 88108**	**2222 044 68108**
	1.5	14	**2222 044 58158**	**2222 044 68158**	
	2.2	15	**2222 044 58228**	**2222 044 68228**	
	3.3	15	**2222 044 58338**	**2222 044 68338**	
	4.7	16	**2222 044 58478**	**2222 044 68478**	
	6.8	17	**2222 044 58688**	**2222 044 68688**	
	10	18	**2222 044 58109**	**2222 044 68109**	
	15	19	**2222 044 58159**	**2222 044 68159**	
	22	20	**2222 044 58229**	**2222 044 68229**	

For detailed information on these and other types see Data Handbook C14
For packing information see page C37/C38



styles 4, 5 and 6

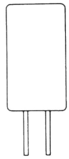
U_R V	C_{nom} µF	case size	cat. number style 4 on reel*	cat. number style 5 ammopack	cat. number style 6 on reel**
250	1	13	**2222 044 23108**	**2222 044 33108**	**2222 044 43108**
	1.5	13	**2222 044 23158**	**2222 044 33158**	**2222 044 43158**
	2.2	13	**2222 044 23228**	**2222 044 33228**	**2222 044 43228**
385	1	13	**2222 044 58108**	**2222 044 48108**	**2222 044 48108**

* positive leading
** negative leading

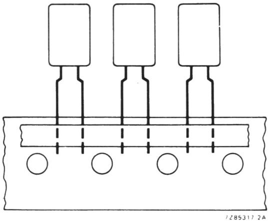
For detailed information on these and other types see Data Handbook C14
For packing information see page C37/C38

Nominal capacitance range (E3–series)	0.22 to 220 µF
Lower tolerance on nominal capacitance	−20%
Upper tolerance on nominal capacitance	+20%
Rated voltage range, U_R (R5–series)	10 to 50 V
Leakage current after 2 minutes	0.7 to 8 µA
Minimum category temperature	−40 °C
Maximum category temperature	+85 °C
Endurance test at 85 °C	2000 h
Shelf life at 0 V, 85 °C	500 h
Basic specification	IEC 384–4
Climatic category	40/085/56
at norm	IEC 68

case size	nominal dimensions (mm)
11	∅ 5 x 11
13	∅ 8.2 x 11



style 2



styles 4 and 5

U_R V	C_{nom} µF	case size	cat. number style 2 in box	cat. number style 4 on reel	cat. number style 5 in ammopack
10	47	11	**2222 013 84479**	**2222 013 24479**	**2222 013 34479**
	220	13	**2222 013 64221**	**2222 013 24221**	**2222 013 34221**
16	33	11	**2222 013 85331**	**2222 013 25331**	**2222 013 35331**
	100	13	**2222 013 65101**	**2222 013 25101**	**2222 013 35101**
25	0.22	11	**2222 013 86227**	**2222 013 26227**	**2222 013 36227**
	0.47	11	**2222 013 86477**	**2222 013 26477**	**2222 013 36477**
	1	11	**2222 013 86108**	**2222 013 26108**	**2222 013 36108**
	2.2	11	**2222 013 86228**	**2222 013 26228**	**2222 013 36228**
	4.7	11	**2222 013 86478**	**2222 013 26478**	**2222 013 36478**
	10	11	**2222 013 86109**	**2222 013 26109**	**2222 013 36109**
	22	11	**2222 013 86229**	**2222 013 26229**	**2222 013 36229**
	47	13	**2222 013 66479**	**2222 013 26479**	**2222 013 36479**
35	100	13	**2222 013 60101**	**2222 013 20101**	**2222 013 30101**
50	0.22	11	**2222 013 81227**	**2222 013 21227**	**2222 013 31227**
	0.47	11	**2222 013 81447**	**2222 013 21477**	**2222 013 31477**
	1	11	**2222 013 81108**	**2222 013 21108**	**2222 013 31108**
	2.2	11	**2222 013 81228**	**2222 013 21228**	**2222 013 31228**
	4.7	11	**2222 013 81478**	**2222 013 21478**	**2222 013 31478**
	10	11	**2222 013 81109**	**2222 013 21109**	**2222 013 31109**
	22	11	**2222 013 81229**	**2222 013 21229**	**2222 013 31229**
	47	13	**2222 013 61479**	**2222 013 21479**	**2222 013 31479**

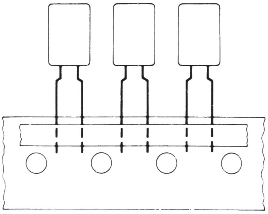
ELECTROLYTIC CAPACITORS; SOLID AND NON SOLID

For detailed information on these and other types see Data Handbook C14
For packing information see page C37/C38

Nominal capacitance range (E3–series)	0.47 to 470 µF
Lower tolerance on nominal capacitance	−20%
Upper tolerance on nominal capacitance	+20%
Rated voltage range, U_R (R5–series)	6.3 to 50 V
Minimum category temperature	−55 °C
Maximum category temperature	+105 °C
Endurance test, at 85°C	5000 h
Shelf life, at 0 V, at 85°C	<5000 h
Basic specification	IEC 384–4
Climatic category	55/105/56

case size	nominal dimensions (mm)
11	∅ 5 x 11
13	∅ 8.2 x 11

style 2



styles 4 and 5

U_R V	C_{nom} µF	case size	cat. number style 2 in box	cat. number style 4 on reel	cat. number style 5 ammopack
6.3	470	13	**2222 116 63471**	**2222 116 23471**	**2222 116 33471**
10	100	11	**2222 116 84101**	**2222 116 24101**	**2222 116 34101**
16	68	11	**2222 116 85689**	**2222 116 25689**	**2222 116 35689**
	220	13	**2222 116 65221**	**2222 116 25221**	**2222 116 35221**
25	47	11	**2222 116 86479**	**2222 116 26479**	**2222 116 36479**
35	33	11	**2222 116 85689**	**2222 116 25689**	**2222 116 35689**
	100	13	**2222 116 60101**	**2222 116 20101**	**2222 116 30101**
50	0.47	11	**2222 116 81477**	**2222 116 21477**	**2222 116 31477**
	1	11	**2222 116 81108**	**2222 116 21108**	**2222 116 31108**
	2.2	11	**2222 116 81228**	**2222 116 21228**	**2222 116 31228**
	4.7	11	**2222 116 81478**	**2222 116 21478**	**2222 116 31478**
	10	11	**2222 116 81109**	**2222 116 21109**	**2222 116 31109**
	22	11	**2222 116 81229**	**2222 116 21229**	**2222 116 31229**
	47	13	**2222 116 61479**	**2222 116 21479**	**2222 116 31479**
	68	13	**2222 116 61689**	**2222 116 21689**	**2222 116 31689**

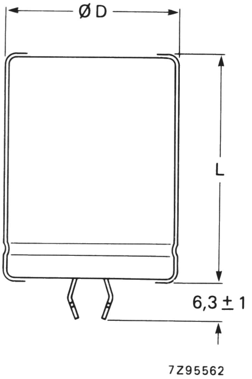
ELECTROLYTIC CAPACITORS; SOLID AND NON–SOLID Gen. data

2222 054/055

For detailed information on these and other types see Data Handbook C14
For packing information see page C37/C38

Nominal capacitance range (E6–series)	68 to 33000 µF
Lower tolerance on nominal capacitance	−20%
Upper tolerance on nominal capacitance	+20%
Rated voltage range, U_R	10 to 385 V
Minimum category temperature	−40 °C
Maximum category temperature	+85 °C
Endurance test at 85 °C	5000 h
Shelf life at 0 V, 85 °C	500 h
Basic specification	IEC 384–4
Climatic category	40/085/56

case size	nominal dimensions (mm)
2230	Ø 22 x 30
2530	Ø 25 x 30
3030	Ø 30 x 30
2240	Ø 22 x 40
2540	Ø 25 x 40
3040	Ø 30 x 40
3540	Ø 35 x 40
3050	Ø 30 x 50



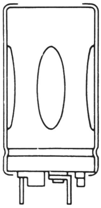
U_R V	C_{nom} µF	case size	cat. number printed–writing pins
10	10000	2240	**2222 054 44103**
	15000	2540	**2222 054 54153**
	22000	3040	**2222 054 54223**
	33000	3540	**2222 054 54333**
16	6800	2530	**2222 054 55682**
	10000	2540	**2222 054 55103**
	15000	3040	**2222 054 55123**
	22000	3540	**2222 054 55223**
25	4700	2530	**2222 054 56472**
	6800	2540	**2222 054 56682**
	10000	3040	**2222 054 56103**
	15000	3540	**2222 054 56153**
40	3300	2530	**2222 054 57332**
	4700	2540	**2222 054 57472**
	6800	3040	**2222 054 57682**
	10000	3540	**2222 054 57103**
63	1500	2530	**2222 054 58152**
	2200	2540	**2222 054 58222**
	3300	3040	**2222 054 58332**
	4700	3540	**2222 054 58472**
100	680	2530	**2222 054 59681**
	1000	2540	**2222 054 59102**
	1500	3040	**2222 054 59152**
	2200	3540	**2222 054 59222**
200	150	2530	**2222 055 52151**
	220	2540	**2222 055 52221**
	330	3040	**2222 055 52331**
	470	3540	**2222 055 52471**
385	68	2530	**2222 055 58689**
	100	2540	**2222 055 58101**
	150	3040	**2222 055 58151**
	220	3540	**2222 055 58221**

ELECTROLYTIC CAPACITORS; SOLID AND NON–SOLID Gen. data
2222 051/053

For detailed information on these and other types see Data Handbook C14
For packing information see page C37/C38

Nominal capacitance range (E6–series)	68 to 47000 µF
Lower tolerance on nominal capacitance	−20%
Upper tolerance on nominal capacitance	+20%
Rated voltage range, U_R	10 to 385 V
Minimum category temperature	−55 °C
Maximum category temperature	+85 °C
Endurance test at 85 °C	
$U_R \leq 100$ V	2000 h
$U_R > 100$ V	5000 h
Shelf life at 0 V, 85 °C	500 h
Basic specification	IEC 384–4
Climatic category	40/085/56, 55/085/56

case size	nominal dimensions (mm)
1	∅ 25 x 35
2	∅ 25 x 45
3	∅ 30 x 45
4	∅ 35 x 45
5	∅ 35 x 55
6	∅ 40 x 45
7	∅ 40 x 55
8	∅ 40 x 75
9	∅ 40 x 105



U_R V	C_{nom} µF	case size	cat. number printed–wiring pins
10	10000	1	**2222 051 54103**
	22000	3	**2222 051 54223**
16	6800	1	**2222 051 55682**
	15000	3	**2222 051 55153**
25	4700	1	**2222 051 56472**
	10000	3	**2222 051 56103**
	22000	5	**2222 051 56223**
40	4700	2	**2222 051 57472**
	10000	4	**2222 051 57103**
63	2200	1	**2222 051 58222**
	4700	3	**2222 051 58472**
	6800	4	**2222 051 58682**
	10000	5	**2222 051 58103**

U_R V	C_{nom} µF	case size	cat. number printed–wiring pins
100	1000	2	**2222 051 59102**
	2200	4	**2222 051 59222**
200	220	2	**2222 053 52221**
	470	4	**2222 053 52471**
	680	5	**2222 053 52681**
	1000	7	**2222 053 52102**
	1500	8	**2222 053 52152**
	2200	9	**2222 053 52222**
385	68	1	**2222 053 58689**
	100	2	**2222 053 58101**
	150	3	**2222 053 58151**
	220	4	**2222 053 58221**
	330	6	**2222 053 48331**
	330	5	**2222 053 58331**
	470	7	**2222 053 58471**

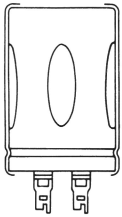
ELECTROLYTIC CAPACITORS; SOLID AND NON–SOLID Gen. data

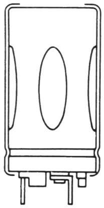
2222 050/052

For detailed information on these and other types see Data Handbook C14
For packing information see page C37/C38

Nominal capacitance range (E6–series)	47 to 47000 µF
Lower tolerance on nominal capacitance	− 10%
Upper tolerance on nominal capacitance	+ 30%
Rated voltage range, U_R	10 to 385 V
Minimum category temperature	− 40 °C
Maximum category temperature	+ 85 °C
Endurance test at 85 °C	5000 h
Shelf life at 0 V, 85 °C	500 h
Basic specification	IEC 384–4
Climatic category	40/085/56

case size	nominal dimensions (mm)
1	∅ 25 x 35
2	∅ 25 x 45
3	∅ 30 x 45
4	∅ 35 x 45
5	∅ 35 x 55
6	∅ 40 x 45
7	∅ 40 x 55
8	∅ 40 x 75
9	∅ 40 x 105





U_R V	C_{nom} µF	case size	cat. number solder tags	cat. number printed–wiring pins
10	4700	1		**2222 050 54472**
	6800	2		**2222 050 54682**
	10000	3	**2222 050 14103**	**2222 050 54103**
	47000	8		**2222 050 54473**
16	3300	1	**2222 050 15332**	**2222 050 55332**
	4700	2	**2222 050 15472**	**2222 050 55472**
	6800	3	**2222 050 15682**	**2222 050 55682**
	10000	4	**2222 050 15103**	
	15000	5	**2222 050 15153**	**2222 050 55153**
	22000	7	**2222 050 15223**	**2222 050 55223**
	47000	9	**2222 050 15473**	
25	2200	1	**2222 050 16222**	**2222 050 56222**
	3300	2		**2222 050 56332**
	4700	3	**2222 050 16472**	**2222 050 56472**
	6800	4	**2222 050 16682**	**2222 050 56682**
	10000	5	**2222 050 16103**	**2222 050 56103**
	15000	7	**2222 050 16153**	
	22000	8	**2222 050 16223**	

For detailed information on these and other types see Data Handbook C14
For packing information see page C37/C38

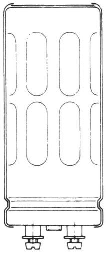
U_R V	C_{nom} µF	case size	cat. number solder tags	cat. number printed–wiring pins
40	1500	1	**2222 050 17152**	**2222 050 57152**
	2200	2	**2222 050 17222**	**2222 050 57222**
	3300	3	**2222 050 17332**	**2222 050 57332**
	4700	4	**2222 050 17472**	**2222 050 57472**
	6800	5	**2222 050 17682**	
	10000	7	**2222 050 17103**	**2222 050 57103**
	15000	8	**2222 050 17153**	
63	1000	1	**2222 050 18102**	**2222 050 58102**
	1500	2	**2222 050 18152**	**2222 050 58152**
	2200	3	**2222 050 18222**	**2222 050 58222**
	3300	4	**2222 050 18332**	**2222 050 58332**
	4700	5	**2222 050 18472**	**2222 050 58472**
	6800	7		**2222 050 58682**
	10000	8	**2222 050 18103**	**2222 050 58103**
100	470	1	**2222 050 19471**	**2222 050 59471**
	1000	3	**2222 050 19102**	**2222 050 59102**
	1500	4		**2222 050 59152**
	2200	5	**2222 050 19222**	**2222 050 59222**
	4700	8	**2222 050 19472**	
250	100	1		**2222 052 53101**
	220	3		**2222 052 53221**
	330	4		**2222 052 53331**
	470	6		
	470	5	**2222 052 13471**	**2222 052 53471**
	680	7		**2222 052 53681**
	1000	8	**2222 052 13102**	**2222 052 53102**
385	47	1	**2222 052 18479**	**2222 052 58479**
	100	3		**2222 052 58101**
	150	4		**2222 052 58151**
	220	5	**2222 052 18221**	**2222 052 58221**
	470	8		**2222 052 58471**

ELECTROLYTIC CAPACITORS; SOLID AND NON–SOLID Gen. data

2222 114/115

For detailed information on these and other types see Data Handbook C14
For packing information see page C37/C38

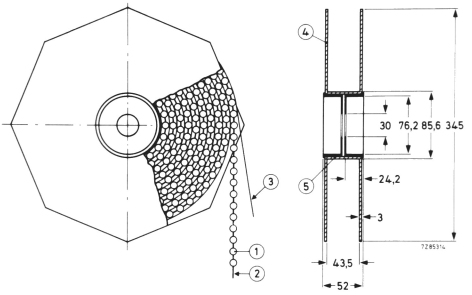
Nominal capacitance range (E6–series)	220 to 68000 µF
Lower tolerance on nominal capacitance	− 10%
Upper tolerance on nominal capacitance	+ 30%
Rated voltage range, U_R	10 to 385 V
Minimum category temperature	− 40 °C
Maximum category temperature	+ 85 °C
Endurance test at 85 °C	8000 h
Shelf life at 0 V, 85 °C	500 h
Basic specification	IEC 384–4
Climatic category	40/085/56



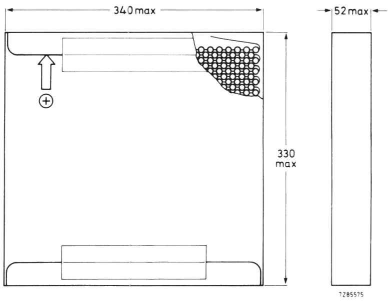
case size	nominal dimensions (mm)
10	∅ 35 x 60
11	∅ 35 x 80
12a	∅ 35 x 105
14	∅ 50 x 80
15a	∅ 50 x 105
16a	∅ 65 x 105
17	∅ 75 x 105

U_R V	C_{nom} µF	case size	cat. number
10	22000	11	**2222 114 14223**
	33000	12	**2222 114 14333**
16	10000	10	**2222 114 15103**
	15000	11	**2222 114 15153**
	22000	12	**2222 114 15223**
	33000	14	**2222 114 15333**
	68000	16	**2222 114 15683**
25	6800	10	**2222 114 16682**
	10000	11	**2222 114 16103**
	22000	14	**2222 114 16223**
	47000	16	**2222 114 16473**
40	4700	10	**2222 114 17472**
	6800	11	**2222 114 17682**
	10000	12	**2222 114 17103**
	15000	14	**2222 114 17153**
	22000	15	**2222 114 17223**
	33000	16	**2222 114 17333**
63	2200	10	**2222 114 18222**
	3300	10	**2222 114 18332**
	4700	11	**2222 114 18472**
	6800	12	**2222 114 18682**
	10000	14	**2222 114 18103**
	15000	15	**2222 114 18153**
	22000	16	**2222 114 18223**
100	1500	10	**2222 114 19152**
	2200	11	**2222 114 19222**
	3300	12	**2222 114 19332**
	4700	14	**2222 114 19472**
	10000	16	**2222 114 19103**
250	680	12	**2222 115 13681**
	1000	14	**2222 115 13102**
	4700	17	**2222 115 13472**
385	220	11	**2222 115 18221**
	470	14	**2222 115 18471**
	1000	16	**2222 115 18102**
	1500	16	**2222 115 18152**
	2200	17	**2222 115 18222**

For detailed information see Data Handbook C14



Capacitors on tape on reel



Capacitors on tape in ammunition pack

1 = capacitor
2 = tape
3 = paper
4 = flange
5 = cylinder

Types 2222 013, 2222 035, 2222 036, 2222 037, 2222 044, 2222 116

	number of capacitors				
case size	style 1 per box	style 2 per box	style 3 per box	style 4 per reel	style 5 per ammunition pack
11	1000	1000	1000	1000	2000
12	1000	1000	1000	1000	2000
13	1000	1000	1000	500	1000
14	1000	1000			
15	500	500			
16	500	500			
17	200	200			
18	200	200			
19	200	200			
20	200	200			

Types 2222 050, 2222 051, 2222 052, 2222 053, 2222 054, 2222 055
Packed in boxes of 100 pcs.

Type 2222 085

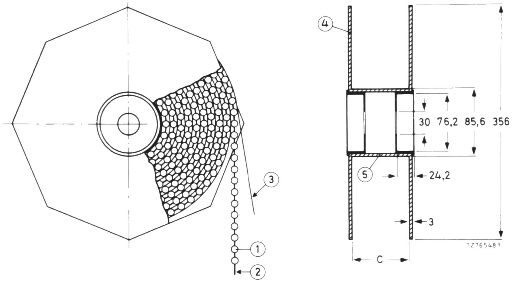
Packed in rails (100 pcs per rail, 1000 pcs. per inner box, 5000 pcs. per outer box), and in 16 mm (case size 1a) or 24 mm (case size 1) blister tape of 2000 pcs. on reel.

Type 2222 114/115

case size	number of capacitors per box
10, 11, 12a, 14, 15a	25
16a, 17	10

Packing information (cont.)

For detailed information see Data Handbook C14



Style 1 capacitors on bandoliers on reel; dimension C is 83.5 mm for case sizes 1, 2, 3 and 5a, and 88.5 mm for case sizes 4, 5, 6 and 7; the overall width of the reel is 94.5 mm and 99.5 mm respectively.

1 = capacitor
2 = bandolier
3 = paper
4 = flange
5 = cylinder

Types 2222 021, 2222 030, 2222 031, 2222 032, 2222 033, 2222 041, 2222 042, 2222 043, 2222 065, 2222 108 2222 117, 2222 118, 2222 119, 2222 132, 2222 133

	number of capacitors				
case size	style 1 on bandoliers per reel	style 1 on bandoliers per box	style 1 per box	style 2 per box	style 3 per box
1	4000	1000	–	–	1000
2	3000	1000	–	–	1000
3	1000	1000	–	–	1000
5a	500	500	–	–	1000
4	1000	1000	–	–	1000
5	500	500	–	–	1000
6	500	500	–	–	1000
7	500	500	–	–	500
00	500	–	200	–	200
01	400	–	200	–	200
02	–	–	200	200	200
03	–	–	200	200	–
04	–	–	100	100	–
05	–	–	100	100	–

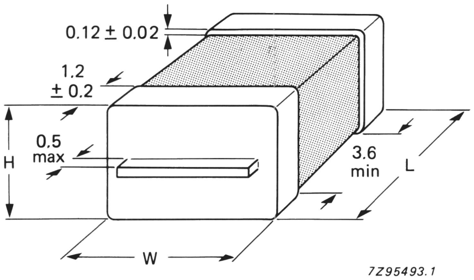
SOLID ALUMINIUM CAPACITORS

General data
2222 127

For detailed information on these and other types see Data Handbook C14
For packing information see page C44

Nominal capacitance range (E3–series)	1 to 68 µF
Upper tolerance on nominal capacitance	−20%
Lower tolerance on nominal capacitance	+20%
Rated voltage range, U_R (R5–series)	63 to 25 V
Minimum category temperature	−55 °C
Maximum category temperature	+125 °C
Usable temperature range	−55 to +175 °C
Endurance test at 125 °C	2000 h
Resistance to soldering heat	260 °C, 10 s; immersion in solder permitted
Basic specification	IEC 384–4
Performance grade	GP
Climatic category	55/125/56
at norm	IEC 68

case size	nominal dimensions (mm)
20	6.5 x 4.4 x 2.9
30	6.5 x 5.5 x 3.4
40	6.5 x 5.5 x 4
50	6.5 x 7.5 x 4
60	6.5 x 7.5 x 5



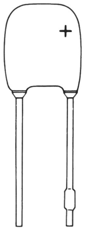
U_R V	C_{nom} µF	case size	cat. number in box	cat. number in blister tape
6.3	15	30		**2222 127 23159**
	47	60	**2222 127 13479**	
	68	60		**2222 127 23689**
10	3.3	20		**2222 127 24338**
	4.7	30		**2222 127 24478**
	10	40		**2222 127 24109**
	22	60	**2222 127 14229**	
16	2.2	40		**2222 127 25228**
	4.7	50	**2222 127 15478**	
25	1	50	**2222 127 16108**	
	1.5	60		**2222 127 26158**

SOLID ALUMINIUM CAPACITORS (cont.)

General data
2222 128

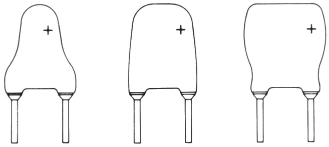
For detailed information on these and other types see Data Handbook C14
For packing information see page C44

Nominal capacitance range (E3–series)	1 to 68 µF
Upper tolerance on nominal capacitance	−20%
Lower tolerance on nominal capacitance	+20%
Rated voltage range, U_R (R5–series)	6.3 to 40 V
Minimum category temperature	−55 °C
Maximum category temperature	+125 °C
Endurance test at 125 °C	2000 h
Endurance test at 85 °C	5000 h (typical)
Basic specification	IEC 384–4
Performance grade	GP
Climatic category	55/125/56
at norm	IEC 68

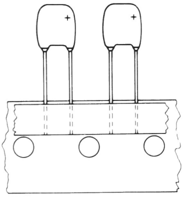


style 2

case size	nominal dimensions (mm)
10	9 x 7 x 3
20	9 x 7 x 3.5
30	9 x 7 x 4
40	9 x 7 x 5
50	9 x 8 x 5
60	9 x 8 x 6



style 1



style 3

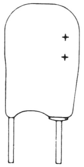
U_R V*	C_{nom} µF	case size	cat. number style 1	cat. number style 2	cat. number style 3
6.3	10	20	**2222 128 53109**	**2222 128 73109**	**2222 128 23109**
	22	30	**2222 128 53229**	**2222 128 73229**	**2222 128 23229**
	47	50	**2222 128 53479**	**2222 128 73479**	**2222 128 23479**
10	4.7	20	**2222 128 54478**	**2222 128 74478**	**2222 128 24478**
	10	30	**2222 128 54109**	**2222 128 74109**	**2222 128 24109**
	22	40	**2222 128 54229**	**2222 128 74229**	**2222 128 24229**
16	2.2	20	**2222 128 55228**	**2222 128 75228**	**2222 128 25228**
	4.7	30	**2222 128 55478**	**2222 128 75478**	**2222 128 25478**
	10	40	**2222 128 55109**	**2222 128 75109**	**2222 128 25109**
	15	50	**2222 128 55159**	**2222 128 75159**	**2222 128 25159**
25	1	20	**2222 128 56108**	**2222 128 76108**	**2222 128 26108**
	2.2	30	**2222 128 56228**	**2222 128 76228**	**2222 128 26228**
	4.7	50	**2222 128 56478**	**2222 128 76478**	**2222 128 26478**
35	0.47	30	**2222 128 50477**	**2222 128 70477**	**2222 128 20477**
	1	40	**2222 128 50108**	**2222 128 70108**	**2222 128 20108**
40**	0.1	10	**2222 128 57107**	**2222 128 77107**	**2222 128 27107**
	0.22	20	**2222 128 57227**	**2222 128 77227**	**2222 128 27227**
	0.47	40	**2222 128 57477**	**2222 128 77477**	**2222 128 27477**
	1	50	**2222 128 57108**	**2222 128 77108**	**2222 128 27108**

* up to $T_{amb} = 125$ °C
** up to $T_{amb} = 85$ °C; >85 and <125 °C $U_R = 25$ V

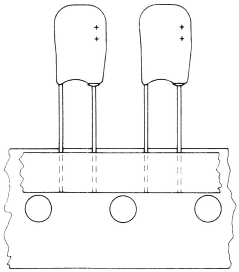
For detailed information on these and other types see Data Handbook C14
For packing information see page C44

Nominal capacitance range (E3–series)	0.1 to 68 µF
Lower tolerance on nominal capacitance	−20%
Upper tolerance on nominal capacitance	+20%
Rated voltage range, U_R	6.3 to 40 V
Minimum category temperature	−55 °C
Maximum category temperature	+125 °C
Endurance test at 85 °C	8000 h
Endurance test at 125°C	5000 h
Basic specification	IEC 384–4
Climatic category	55/125/56

case size	nominal dimensions (mm)
1	12.5 x 8 x 3.5
2	12.5 x 8 x 4.5
3	12.5 x 8 x 5
4	12.5 x 8 x 6



style 1



style 3

U_R V	C_{nom} µF	case size	cat. number style 1	cat. number style 3
6.3	10	1	**2222 122 53109**	**2222 122 23109**
	22	2	**2222 122 53229**	**2222 122 23229**
	33	3	**2222 122 53339**	**2222 122 23339**
	47	4	**2222 122 53479**	**2222 122 23479**
	68	4	**2222 122 53689**	**2222 122 23689**
10	4.7	1	**2222 122 54478**	**2222 122 24478**
	10	2	**2222 122 54109**	**2222 122 24109**
	22	3	**2222 122 54229**	**2222 122 24229**
	33	4	**2222 122 54339**	**2222 122 24339**
16	4.7	2	**2222 122 55478**	**2222 122 25478**
	10	3	**2222 122 55109**	**2222 122 25109**
	15	4	**2222 122 55159**	**2222 122 25159**

For detailed information on these and other types see Data Handbook C14
For packing information see page C44

U_R V	C_{nom} µF	case size	cat. number style 1	cat. number style 3
25	1	1	**2222 122 56108**	**2222 122 26108**
35	1	2	**2222 122 50108**	**2222 122 20108**
40	0.1	1	**2222 122 57107**	**2222 122 27107**
	0.22	1	**2222 122 57227**	**2222 122 27227**
	1	3	**2222 122 57108**	**2222 122 27108**
	1.5	4	**2222 122 57158**	**2222 122 27158**
	2.2	4	**2222 122 57228**	**2222 122 27228**

For detailed information on these and other types see Data Handbook C14
For packing information see page C44

Nominal capacitance range (E3–series)	2.2 to 1500 μF
Lower tolerance on nominal capacitance	−20%
Upper tolerance on nominal capacitance	+20%
Rated voltage range, U_R	6.3 to 40 V
Minimum category temperature	−55 °C
Maximum category temperature	+125 °C
Usable temperature range	−80 to +200 °C
Endurance test at 155 °C	5000 h
Endurance test at 125 °C	8000 h
Basic specification	IEC 384–4
Climatic category	55/125/56

case size	nominal dimensions (mm)
1	∅ 6.5 x 15
2a	∅ 7.5 x 20
4	∅ 9 x 23
5	∅ 10 x 31.5
6	∅ 12.5 x 31.5

U_R V	C_{nom} μF	case size	cat. number
6.3	47	1	**2222 123 13479**
	150	2a	**2222 123 13151**
	330	4	**2222 123 13331**
	1000	6	**2222 123 13102**
10	33	1	**2222 123 14339**
	47	1	**2222 123 14479**
	68	2a	**2222 123 14689**
	100	2a	**2222 123 14101**
	220	4	**2222 123 14221**
	470	5	**2222 123 14471**
16	10	1	**2222 123 15109**
	15	1	**2222 123 15159**
	22	1	**2222 123 15229**
	33	2a	**2222 123 15339**
	68	2a	**2222 123 15689**
	100	4	**2222 123 15101**

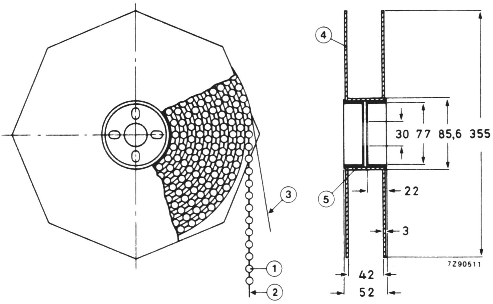
U_R V	C_{nom} μF	case size	cat. number
25	10	1	**2222 123 16109**
	22	2a	**2222 123 16229**
	68	4	**2222 123 16689**
	100	4	**2222 123 16101**
40	2.2	1	**2222 123 17228**
	4.7	1	**2222 123 17478**
	6.8	1	**2222 123 17688**
	10	2a	**2222 123 17109**
	15	2a	**2222 123 17159**
	22	4	**2222 123 17229**
	33	4	**2222 123 17339**
	47	5	**2222 123 17479**
	68	5	**2222 123 17689**
	100	6	**2222 123 17101**

Packing information

For detailed information see Data Handbook C14

Type 2222 122/128
Style 3 capacitors on tape on reel

1 = capacitor
2 = tape
3 = paper
4 = flange
5 = cylinder



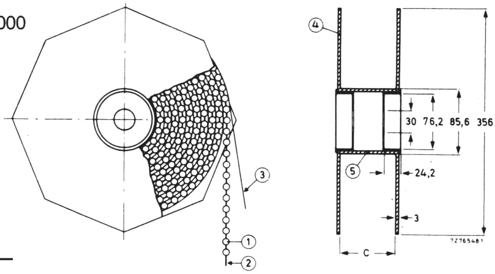
case size	number of capacitors	
	style 1 per box	style 3 per reel
1,2,20,30	1000	2000
3,4,40,50,60	1000	1000

Type 2222 123
Number of capacitors (on bandoliers) per box is 100;
on reel: case sizes 1–2A, 800 pcs. 4–5, 500 pcs. 6 400 pcs.

Type 2222 125
Number of capacitors (on bandoliers) per reel is 1000

Capacitors on bandoliers on reel; C = 83.5 mm;
overall width is 94.5 mm

1 = capacitor
2 = tape
3 = paper
4 = flange
5 = cylinder



Type 2222 126

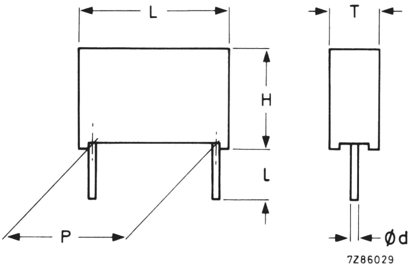
case size	number of capacitors	
	per box	per blister tape
20	1000	3000
30	1000	2000
40	1000	1500
50	1000	1500
60	1000	1000

INTERFERENCE SUPPRESSION CAPACITORS

General data
2222 330 (MKT–P)

For detailed information on these and other types see Data Handbook C22

Rated capacitance range (E–6 series)	0.01 to 1 µF
Upper tolerance on rated capacitance	–20%
Lower tolerance on rated capacitance	+20%
Rated voltage $U_{R(a.c.)}$, 50/60 Hz	250 V
Minimum category temperature	–40 °C
Maximum category temperature	+85 °C
Climatic category	40/085/21
Related specification	IEC 384–14
Class	2
Dielectric	PETP–P
Approvals	VDE 565–1, SEMKO, IMQ (CEI 40–7), UL 1283



250 V–range

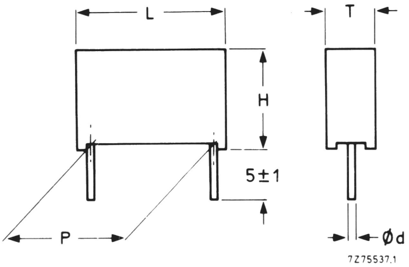
rated cap. µF	T_{max} mm	H_{max} mm	L_{max} mm	P mm	d mm	l = 5 mm cat.number	l = 25 mm cat.number
0.01	5	11	17.5	15	0.8	**2222 330 40103**	**2222 330 44103**
0.015	5	11	17.5	15	0.8	**2222 330 40153**	**2222 330 44153**
0.022	5	11	17.5	15	0.8	**2222 330 40223**	**2222 330 44223**
0.033	5	11	17.5	15	0.8	**2222 330 40333**	**2222 330 44333**
0.047	6	11.5	17.5	15	0.8	**2222 330 40473**	**2222 330 44473**
0.068	7	13	17.5	15	0.8	**2222 330 40683**	**2222 330 44683**
0.1	8.5	14.5	17.5	15	0.8	**2222 330 40104**	**2222 330 44104**
0.15	7	16	26	22.5	0.8	**2222 330 40154**	**2222 330 44154**
0.22	8.5	17.5	26	22.5	0.8	**2222 330 40224**	**2222 330 44224**
0.33	10	18.5	26	22.5	0.8	**2222 330 40334**	**2222 330 44334**
0.47	13	22.5	31	27.5	0.8	**2222 330 40474**	**2222 330 44474**
0.68	15	25	31	27.5	0.8	**2222 330 40684**	**2222 330 44684**
1	18	28	31	27.5	0.8	**2222 330 40105**	**2222 330 44105**

METALLIZED FILM CAPACITORS

General data
2222 344 (MKT and MKC)

For detailed information on these and other types see Data Handbook C22

Rated capacitance (E–12 series)	0.01 to 10 µF
Upper tolerance on rated capacitance	– 10%
Lower tolerance on rated capacitance	+ 10%
Rated voltage U_R (d.c.)	63 V, 100 V, 250 V, 400 V
Rated voltage U_R, 50/60 Hz	40 V, 63 V, 160 V, 220 V
Minimum category temperature	– 55 °C
Maximum category temperature	+ 100 °C
Climatic category	55/100/56
at norm	IEC 68
Related specification	IEC 384–2, IEC 384–6
Dielectric	PC, PETP



63 V–range

rated cap. µF	T_{max} mm	H_{max} mm	L_{max} mm	P mm	d mm	MKT cat. number
0.22	4.5	10	13	10	0.8	**2222 344 15224**
0.33	5	11	13	10	0.8	**2222 344 15334**
0.47	5	11	13	10	0.8	**2222 344 15474**
0.68	6	12	17.5	15	0.8	**2222 344 15684**
1	7	13	17.5	15	0.8	**2222 344 15105**
1.5	8.5	14.5	17.5	15	0.8	**2222 344 15155**
2.2	6.5	15.5	26	22.5	0.8	**2222 344 15225**
3.3	8.5	17.5	26	22.5	0.8	**2222 344 15335**
4.7	9.5	19	26	22.5	0.8	**2222 344 15475**
6.8	11	20	31	27.5	0.8	**2222 344 15685**
10	13.5	22.5	31	27.5	0.8	**2222 344 15106**

For detailed information on these and other types see Data Handbook C22

100 V–range

rated cap. µF	T_{max} mm	H_{max} mm	L_{max} mm	P mm	d mm	MKC cat. number	MKT cat. number
0.1	4.5	10	13	10	0.8	**2222 344 21104**	**2222 344 25104**
0.15	4.5	10	13	10	0.8	**2222 344 21154**	**2222 344 25154**
0.22	4.5	10	13	10	0.8	**2222 344 21224**	**2222 344 25224**
0.33	5	11	17.5	15	0.8	**2222 344 21334**	**2222 344 25334**
0.47	5	11	17.5	15	0.8	**2222 344 21474**	**2222 344 25474**
0.68	6	12	17.5	15	0.8	**2222 344 21684**	**2222 344 25684**
1	7	13	17.5	15	0.8	**2222 344 21105**	**2222 344 25105**
1.5	6.5	15.5	26	22.5	0.8	**2222 344 21155**	**2222 344 25155**
2.2	8.5	17.5	26	22.5	0.8	**2222 344 21225**	**2222 344 25225**
3.3	9.5	19	26	22.5	0.8	**2222 344 21335**	**2222 344 25335**
4.7	11	20	31	22.5	0.8	**2222 344 21475**	**2222 344 25475**
6.8	13	22.5	31	27.5	0.8	**2222 344 21685**	**2222 344 25685**
10	15	25	31	27.5	0.8		**2222 344 25106**

250 V–range

rated cap. µF	T_{max} mm	H_{max} mm	L_{max} mm	P mm	d mm	MKC cat. number	MKT cat. number
0.047	4.5	10	13	10	0.8	**2222 344 45473**	**2222 344 41473**
0.068	4.5	10	13	10	0.8	**2222 344 45683**	**2222 344 41683**
0.1	5	11	17.5	15	0.8	**2222 344 45104**	**2222 344 41104**
0.15	5	11.5	17.5	15	0.8	**2222 344 45154**	**2222 344 41154**
0.22	6	12	17.5	15	0.8	**2222 344 45224**	**2222 344 41224**
0.33	7	13	17.5	15	0.8	**2222 344 45334**	**2222 344 41334**
0.47	6.5	15.5	26	22.5	0.8	**2222 344 45474**	**2222 344 41474**
0.68	6.5	15.5	26	22.5	0.8	**2222 344 45684**	**2222 344 41684**
1	8.5	17.5	26	22.5	0.8	**2222 344 45105**	**2222 344 41105**
1.5	11	20	31	27.5	0.8	**2222 344 45155**	**2222 344 41155**
2.2	11	20	31	27.5	0.8	**2222 344 45225**	**2222 344 41225**

For detailed information on these and other types see Data Handbook C22

400 V–range

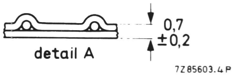
rated cap. µF	T_{max} mm	H_{max} mm	L_{max} mm	P mm	d mm	MKC cat. number	MKT cat. number
0.01	4.5	10	13	10	0.8	**2222 344 51103**	**2222 344 55103**
0.015	4.5	10	13	10	0.8	**2222 344 51153**	**2222 344 55153**
0.022	4.5	10	13	10	0.8	**2222 344 51223**	**2222 344 55223**
0.033	4.5	10	13	10	0.8	**2222 344 51333**	**2222 344 55333**
0.047	5	11	17.5	15	0.8	**2222 344 51473**	**2222 344 55473**
0.068	6	12	17.5	15	0.8	**2222 344 51683**	**2222 344 55683**
0.1	7	13	17.5	15	0.8	**2222 344 51104**	**2222 344 55104**
0.15	8.5	14.5	17.5	15	0.8	**2222 344 51154**	**2222 344 55154**
0.22	6.5	15.5	26	22.5	0.8	**2222 344 51224**	**2222 344 55224**
0.33	7.5	16.5	26	22.5	0.8	**2222 344 51334**	**2222 344 55334**
0.47	9.5	19	26	22.5	0.8	**2222 344 51474**	**2222 344 55474**
0.68	11	20	31	27.5	0.8	**2222 344 51684**	**2222 344 55684**
1	13	22.5	31	27.5	0.8	**2222 344 51105**	**2222 344 55105**

METALLIZED FILM CAPACITORS (cont.)

General data
2222 365 (MKT)

For detailed information on these and other types see Data Handbook C22

Rated capacitance (E–12 series)	0.0047 to 1 µF
Upper tolerance on rated capacitance	– 10%
Lower tolerance on rated capacitance	+ 10%
Rated voltage U_R (d.c.)	63 V, 100 V, 250 V, 400 V
Rated voltage U_R (a.c.), 50/60 Hz	40 V, 63 V, 160 V, 220 V
Minimum category temperature	– 40 °C
Maximum category temperature	+ 100 °C
Climatic category	40/100/56
at norm	IEC 68
Related specification	IEC 384–2
Performance grade	Grade 1 (LL)
Dielectric	PETP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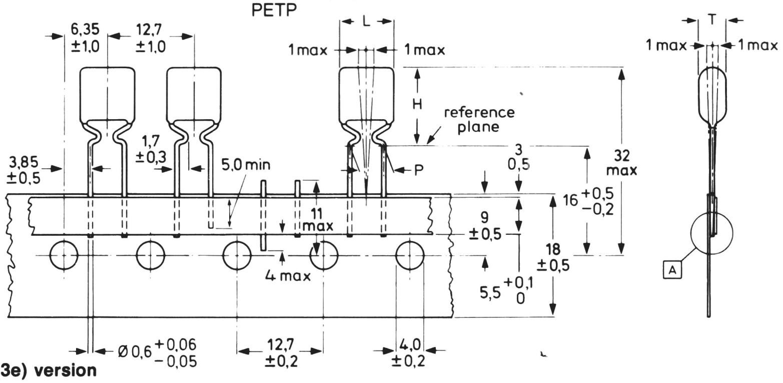
6,35
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1 max
T
1 max
1 max
H
reference
plane
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3,85
±0,5
5,0 min
3
0,5
P
32
max
16 +0,5 −0,2
11
max
9
±0,5
18
±0,5
4 max
5,5 +0,1 0
A
Ø 0,6 +0,06 −0,05
12,7
±0,2
4,0
±0,2

63 V–range; 2e (3e) version

rated cap. µF	T_{max} mm	H_{max} mm	L_{max} mm	cat. number on reel	cat. number ammo pack
0.15	4	13.5	10	**2222 365 11154**	**2222 365 15154**
0.22	4	13.5	10	**2222 365 11224**	**2222 365 15224**
0.33	5	14.5	10.5	**2222 365 11334**	**2222 365 15334**
0.47	5.5	15	10.5	**2222 365 11474**	**2222 365 15474**
0.68	5.5	15	10.5	**2222 365 11684**	**2222 365 15684**
1	5.5	15	10.5	**2222 365 11105**	**2222 365 15105**

63 V–range; 2e version

rated cap. µF	T_{max} mm	H_{max} mm	L_{max} mm	cat. number on reel	cat. number ammo pack
0.047	3.5	12.5	7.5	**2222 365 71473**	**2222 365 75473**
0.068	3.5	12.5	7.5	**2222 365 71683**	**2222 365 75683**
0.1	3.5	12.5	7.5	**2222 365 71104**	**2222 365 75104**
0.15	4	13	7.5	**2222 365 71154**	**2222 365 75154**
0.22	4.5	13.5	7.5	**2222 365 71224**	**2222 365 75224**
0.33	5.5	14.5	7.5	**2222 365 71334**	**2222 365 75334**
0.47	6	15.5	7.5	**2222 365 71474**	**2222 365 75474**
0.68	5.5	14.5	7.5	**2222 365 71684**	**2222 365 75684**
1	6.5	15.5	7.5	**2222 365 71105**	**2222 365 75105**

For detailed information on these and other types see Data Handbook C22

100 V–range; 2e (3e) version

rated cap. µF	T_{max} mm	H_{max} mm	L_{max} mm	cat. number on reel	cat. number ammo pack
0.047	4	13.5	10	**2222 365 21473**	**2222 365 25473**
0.068	4	13.5	10	**2222 365 21683**	**2222 365 25683**
0.1	4	13.5	10	**2222 365 21104**	**2222 365 25104**
0.15	5	14.5	10.5	**2222 365 21154**	**2222 365 25154**
0.22	5.5	15	10.5	**2222 365 21224**	**2222 365 25224**
0.33	6	15.5	10.5	**2222 365 21334**	**2222 365 25334**
0.47	6	15.5	10.5	**2222 365 21474**	**2222 365 25474**

100 V–range; 2e version

rated cap. µF	T_{max} mm	H_{max} mm	L_{max} mm	cat. number on reel	cat. number ammo pack
0.01	3.5	12.5	7.5	**2222 365 81103**	**2222 365 85103**
0.015	3.5	12.5	7.5	**2222 365 81153**	**2222 365 85153**
0.022	3.5	12.5	7.5	**2222 365 81223**	**2222 365 85223**
0.033	3.5	12.5	7.5	**2222 365 81333**	**2222 365 85333**
0.047	4	13	7.5	**2222 365 81473**	**2222 365 85473**
0.068	4.5	13.5	7.5	**2222 365 81683**	**2222 365 85683**
0.1	4.5	13.5	7.5	**2222 365 81104**	**2222 365 85104**

250 V–range; 2e (3e) version

rated cap. µF	T_{max} mm	H_{max} mm	L_{max} mm	cat. number on reel	cat. number ammo pack
0.022	4	13.5	10	**2222 365 41223**	**2222 365 45223**
0.033	4	13.5	10	**2222 365 41333**	**2222 365 45333**
0.047	4	13.5	10	**2222 365 41474**	**2222 365 45474**

400 V–range; 2e (3e) version

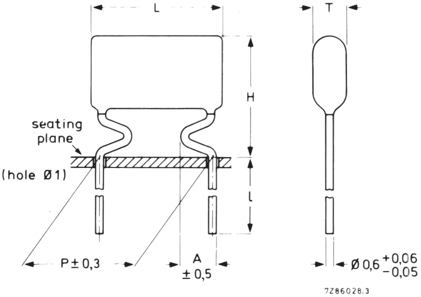
rated cap. µF	T_{max} mm	H_{max} mm	L_{max} mm	cat. number on reel	cat. number ammo pack
0.0047	4	13.5	10	**2222 365 51472**	**2222 365 55472**
0.0068	4	13.5	10	**2222 365 51682**	**2222 365 55682**
0.01	4	13.5	10	**2222 365 51103**	**2222 365 55103**
0.015	4	13.5	10	**2222 365 51153**	**2222 365 55153**

METALLIZED FILM CAPACITORS (cont.)

General data
2222 366 (MKT)

For detailed information on these and other types see Data Handbook C22

Rated capacitance (E–12 series)	0.0047 to 1 μF
Upper tolerance on rated capacitance	− 10%
Lower tolerance on rated capacitance	+ 10%
Rated voltage U_R (d.c.)	63 V, 100 V, 250 V, 400 V
Rated voltage U_R (a.c.), 50/60 Hz	40 V, 63 V, 160 V, 220 V
Minimum category temperature	− 40 °C
Maximum category temperature	+ 100 °C
Climatic category	40/100/56
at norm	IEC 68
Related specification	IEC 384–2
Dielectric	PETP



63 V–range; pitch (P) = 7.62 mm

rated cap. μF	T_{max} mm	H_{max} mm	L_{max} mm	A mm	l = 4 mm cat. number	l = 17 mm cat. number
0.15	4	12	10	2	**2222 366 15154**	**2222 366 11154**
0.22	4	12	10	2	**2222 366 15224**	**2222 366 11224**
0.33	5	13.5	10.5	2	**2222 366 15334**	**2222 366 11334**
0.47	5.5	14	10.5	2	**2222 366 15474**	**2222 366 11474**
0.68	5.5	14.5	10.5	2	**2222 366 15684**	**2222 366 11684**
1	5.5	14.5	10.5	2	**2222 366 15105**	**2222 366 11105**

63 V–range; pitch (P) = 5.08 mm

rated cap. μF	T_{max} mm	H_{max} mm	L_{max} mm	A mm	l = 4 mm cat. number	l = 17 mm cat. number
0.047	3.5	12.5	7.5	1.7	**2222 366 75473**	**2222 366 71473**
0.068	3.5	12.5	7.5	1.7	**2222 366 75683**	**2222 366 71683**
0.1	3.5	12.5	7.5	1.7	**2222 366 75104**	**2222 366 71104**
0.15	4	13	7.5	1.7	**2222 366 75154**	**2222 366 71154**
0.22	4.5	13.5	7.5	1.7	**2222 366 75224**	**2222 366 71224**
0.33	5.5	14.5	7.5	1.7	**2222 366 75334**	**2222 366 71334**
0.47	6	15.5	7.5	1.7	**2222 366 75474**	**2222 366 71474**
0.68	5.5	14.5	7.5	1.7	**2222 366 75684**	**2222 366 71684**
1	6.5	15.5	7.5	1.7	**2222 366 75105**	**2222 366 71105**

For detailed information on these and other types see Data Handbook C22

100 V–range; pitch (P) = 7.62 mm

rated cap. µF	T_{max} mm	H_{max} mm	L_{max} mm	A mm	l = 4 mm cat. number	l = 17 mm cat. number
0.047	4	12	10	2	**2222 366 25473**	**2222 366 21473**
0.068	4	11	10	2	**2222 366 25683**	**2222 366 21683**
0.1	4	13	10	2	**2222 366 25104**	**2222 366 21104**
0.15	5	13	10.5	2	**2222 366 25154**	**2222 366 21154**
0.22	5.5	13.5	10.5	2	**2222 366 25224**	**2222 366 21224**
0.33	6	15	10.5	2	**2222 366 25334**	**2222 366 21334**
0.47	6	15	10.5	2	**2222 366 25474**	**2222 366 21474**

100 V–range; pitch (P) = 5.08 mm

rated cap. µF	T_{max} mm	H_{max} mm	L_{max} mm	A mm	l = 4 mm cat. number	l = 17 mm cat. number
0.01	3.5	12.5	7.5	1.7	**2222 366 85103**	**2222 366 81103**
0.015	3.5	12.5	7.5	1.7	**2222 366 85153**	**2222 366 81153**
0.022	3.5	12.5	7.5	1.7	**2222 366 85223**	**2222 366 81223**
0.033	3.5	12.5	7.5	1.7	**2222 366 85333**	**2222 366 81333**
0.047	4	13	7.5	1.7	**2222 366 85473**	**2222 366 81473**
0.068	4.5	13.5	7.5	1.7	**2222 366 85683**	**2222 366 81683**
0.1	4.5	13.5	7.5	1.7	**2222 366 85104**	**2222 366 81104**

250 V–range; pitch (P) = 7.62 mm

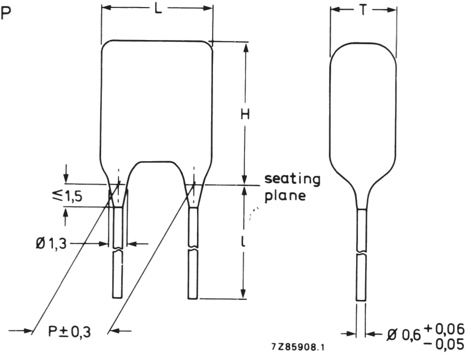
rated cap. µF	T_{max} mm	H_{max} mm	L_{max} mm	A mm	l = 4 mm cat. number	l = 17 mm cat. number
0.022	4	13	10	2	**2222 366 45223**	**2222 366 41223**
0.033	4	13	10	2	**2222 366 45333**	**2222 366 41333**
0.047	4	13	10	2	**2222 366 45473**	**2222 366 41473**

400 V–range; pitch (P) = 7.62 mm

rated cap. µF	T_{max} mm	H_{max} mm	L_{max} mm	A mm	l = 4 mm cat. number	l = 17 mm cat. number
0.0047	4	12	10	2	**2222 366 55472**	**2222 366 51472**
0.0068	4	13	10	2	**2222 366 55682**	**2222 366 51682**
0.01	4	13	10	2	**2222 366 55103**	**2222 366 51103**
0.015	4	13	10	2	**2222 366 55153**	**2222 366 51153**

For detailed information on these and other types see Data Handbook C22

Rated capacitance (E–12 series)	0.0047 to 1 µF
Upper tolerance on rated capacitance	−10%
Lower tolerance on rated capacitance	+10%
Rated voltage U_R (d.c.)	63 V, 100 V, 250 V, 400 V
Rated voltage U_R (a.c.), 50/60 Hz	40 V, 63 V, 160 V, 220 V
Minimum category temperature	−40 °C
Maximum category temperature	+100 °C
Climatic category	40/100/56
at norm	IEC 68
Related specification	IEC 384–2
Dielectric	PETP



63 V–range; pitch (P) = 7.62 mm

rated cap. µF	T_{max} mm	H_{max} mm	L_{max} mm	l = 5 mm cat. number	l = 22 mm cat. number
0.15	4	8	10	**2222 367 15154**	**2222 367 11154**
0.22	4	8	10	**2222 367 15224**	**2222 367 11224**
0.33	5	9	10.5	**2222 367 15334**	**2222 367 11334**
0.47	5.5	9.5	10.5	**2222 367 15474**	**2222 367 11474**
0.68	5.5	10	10.5	**2222 367 15684**	**2222 367 11684**
1	5.5	10	10.5	**2222 367 15105**	**2222 367 11105**

63 V–range; pitch (P) = 5.08 mm

rated cap. µF	T_{max} mm	H_{max} mm	L_{max} mm	l = 4 mm cat. number	l = 22 mm cat. number
0.047	3.5	7.5	7.5	**2222 367 75473**	**2222 367 71473**
0.068	3.5	7.5	7.5	**2222 367 75683**	**2222 367 71683**
0.1	3.5	7.5	7.5	**2222 367 75104**	**2222 367 71104**
0.15	4	8	7.5	**2222 367 75154**	**2222 367 71154**
0.22	4.5	8.5	7.5	**2222 367 75224**	**2222 367 71224**
0.33	5.5	9.5	7.5	**2222 367 75334**	**2222 367 71334**
0.47	6	11.5	7.5	**2222 367 75474**	**2222 367 71474**
0.68	5.5	10.5	7.5	**2222 367 75684**	**2222 367 71684**
1	6.5	11.5	7.5	**2222 367 75105**	**2222 367 71105**

For detailed information on these and other types see Data Handbook C22

100 V–range; pitch (P) = 7.62 mm

rated cap. µF	T_{max} mm	H_{max} mm	L_{max} mm	l = 4 mm cat. number	l = 22 mm cat. number
0.047	4	8	10	**2222 367 25473**	**2222 367 21473**
0.068	4	8	10	**2222 367 25683**	**2222 367 21683**
0.1	4	8	10	**2222 367 25104**	**2222 367 21104**
0.15	5	9.5	10.5	**2222 367 25154**	**2222 367 21154**
0.22	5.5	10	10.5	**2222 367 25224**	**2222 367 21224**
0.33	6	10.5	10.5	**2222 367 25334**	**2222 367 21334**
0.47	6	10.5	10.5	**2222 367 25474**	**2222 367 21474**

100 V–range; pitch (P) = 5.08 mm

rated cap. µF	T_{max} mm	H_{max} mm	L_{max} mm	l = 4 mm cat. number	l = 22 mm cat. number
0.01	3.5	7.5	7.5	**2222 367 85103**	**2222 367 81103**
0.015	3.5	7.5	7.5	**2222 367 85153**	**2222 367 81153**
0.022	3.5	7.5	7.5	**2222 367 85223**	**2222 367 81223**
0.033	3.5	7.5	7.5	**2222 367 85333**	**2222 367 81333**
0.047	4	8	7.5	**2222 367 85473**	**2222 367 81473**
0.068	4.5	8.5	7.5	**2222 367 85683**	**2222 367 81683**
0.1	4.5	8.5	7.5	**2222 367 85104**	**2222 367 81104**

250 V–range; pitch (P) = 7.62 mm

rated cap. µF	T_{max} mm	H_{max} mm	L_{max} mm	l = 5 mm cat. number	l = 22 mm cat. number
0.022	4	8.5	10	**2222 367 45223**	**2222 367 41223**
0.033	4	8.5	10	**2222 367 45333**	**2222 367 41333**
0.047	4	8.5	10	**2222 367 45473**	**2222 367 41473**

400 V–range; pitch (P) = 7.62 mm

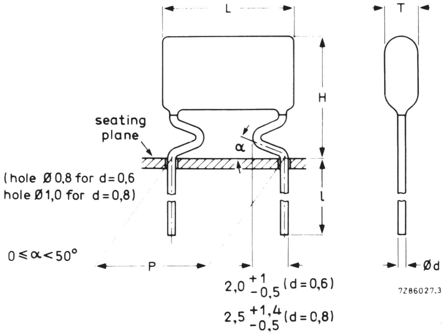
rated cap. µF	T_{max} mm	H_{max} mm	L_{max} mm	l = 5 mm cat. number	l = 22 mm cat. number
0.0047	4	8.5	10	**2222 367 55472**	**2222 367 51472**
0.0068	4	8.5	10	**2222 367 55682**	**2222 367 51682**
0.01	4	8.5	10	**2222 367 55103**	**2222 367 51103**
0.015	4	8.5	10	**2222 367 55153**	**2222 367 51153**

METALLIZED FILM CAPACITORS (cont.)

General data
2222 368 (MKT)

For detailed information on these and other types see Data Handbook C22

Rated capacitance (E–12 series)	0.001 to 6.8 µF
Upper tolerance on rated capacitance	− 10%
Lower tolerance on rated capacitance	+ 10%
Rated voltage U_R (d.c.)	100 V, 250 V, 400 V
Rated voltage U_R (a.c.), 50/60 Hz	63 V, 160 V, 220 V
Minimum category temperature	− 40 °C
Maximum category temperature	+ 100 °C
Climatic category	40/100/56
at norm	IEC 68
Related specification	IEC 384–2
Performance grade	grade 1 (LL)
Dielectric	PETP



100 V–range

rated cap. µF	T_{max} mm	H_{max} mm	L_{max} mm	P mm	d mm	l = 5 mm cat. number	l = 17 mm cat. number
0.068	4	12	12.5	10.16	0.6	**2222 368 25683**	**2222 368 21683**
0.10	4	12	12.5	10.16	0.6	**2222 368 25104**	**2222 368 21104**
0.15	4	12	12.5	10.16	0.6	**2222 368 25154**	**2222 368 21154**
0.22	5	13	12.5	10.16	0.6	**2222 368 25224**	**2222 368 21224**
0.33	5	14	17.5	15.14	0.8	**2222 368 25334**	**2222 368 21334**
0.47	5.5	14.5	17.5	15.14	0.8	**2222 368 25474**	**2222 368 21474**
0.68	6.0	15.0	17.5	15.14	0.8	**2222 368 25684**	**2222 368 21684**
1.0	7.5	16.5	17.5	15.14	0.8	**2222 368 25105**	**2222 368 21105**
1.5	6.0	18.0	26	22.86	0.8	**2222 368 25155**	**2222 368 21155**
2.2	6.5	18.5	26	22.86	0.8	**2222 368 25225**	**2222 368 21225**
3.3	8.5	20.5	26	22.86	0.8	**2222 368 25335**	**2222 368 21335**
4.7	9.5	21.5	30	22.86	0.8	**2222 368 25475**	**2222 368 21475**
6.8	11.5	23.5	30	22.86	0.8	**2222 368 25685**	**2222 368 21685**

For detailed information on these and other types see Data Handbook C22

250 V–range

rated cap. µF	T_{max} mm	H_{max} mm	L_{max} mm	P mm	d mm	l = 4 mm cat. number	l = 17 mm cat. number
0.033	4	12	12.5	10.16	0.6	**2222 368 45333**	**2222 368 41333**
0.047	4	12	12.5	10.16	0.6	**2222 368 45473**	**2222 368 41473**
0.068	4.5	12.5	12.5	10.16	0.6	**2222 368 45683**	**2222 368 41683**
0.1	5	13	12.5	10.16	0.6	**2222 368 45104**	**2222 368 41104**
0.15	5	14	17.5	15.24	0.8	**2222 368 45154**	**2222 368 41154**
0.22	6	15	17.5	15.24	0.8	**2222 368 45224**	**2222 368 41224**
0.33	7	16	17.5	15.24	0.8	**2222 368 45334**	**2222 368 41334**
0.47	5.5	17.5	26	22.86	0.8	**2222 368 45474**	**2222 368 41474**
0.68	6.5	18.5	26	22.86	0.8	**2222 368 45684**	**2222 368 41684**
1	7.5	19.5	30	27.94	0.8	**2222 368 45105**	**2222 368 41105**
1.5	8.5	20.5	30	27.94	0.8	**2222 368 45155**	**2222 368 41155**
2.2	10.5	22.5	30	27.94	0.8	**2222 368 45225**	**2222 368 41225**

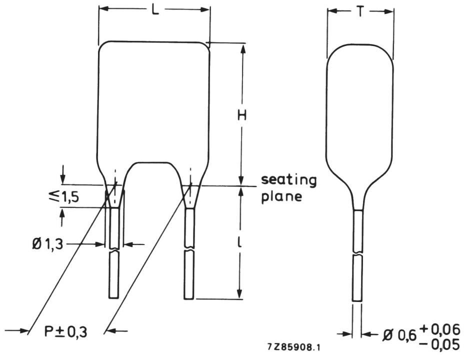
400 V–range

rated cap. µF	T_{max} mm	H_{max} mm	L_{max} mm	P mm	d mm	l = 4 mm cat. number	l = 17 mm cat. number
0.0010	4	12	12.5	10.16	0.6	**2222 368 55102**	**2222 368 51102**
0.0015	4	12	12.5	10.16	0.6	**2222 368 55152**	**2222 368 51152**
0.0022	4	12	12.5	10.16	0.6	**2222 368 55222**	**2222 368 51222**
0.0033	4	12	12.5	10.16	0.6	**2222 368 55332**	**2222 368 51332**
0.0047	4	12	12.5	10.16	0.6	**2222 368 55472**	**2222 368 51472**
0.0068	4	12	12.5	10.16	0.6	**2222 368 55682**	**2222 368 51682**
0.010	4	12	12.5	10.16	0.6	**2222 368 55103**	**2222 368 51103**
0.015	4	12	12.5	10.16	0.6	**2222 368 55153**	**2222 368 51153**
0.022	4	12	12.5	10.16	0.6	**2222 368 55223**	**2222 368 51223**
0.033	4.5	12.5	12.5	10.16	0.6	**2222 368 55333**	**2222 368 51333**
0.047	5	14	17.5	15.24	0.8	**2222 368 55473**	**2222 368 51473**
0.068	5	14	17.5	15.24	0.8	**2222 368 55683**	**2222 368 51683**
0.1	6	15	17.5	15.24	0.8	**2222 368 55104**	**2222 368 51104**
0.15	7	16	17.5	15.24	0.8	**2222 368 55154**	**2222 368 51154**
0.22	5.5	17.5	26	22.86	0.8	**2222 368 55224**	**2222 368 51224**
0.33	6.5	18.5	26	22.86	0.8	**2222 368 55334**	**2222 368 51334**
0.47	8	20	26	22.86	0.8	**2222 368 55474**	**2222 368 51474**
0.68	8.5	20.5	30	27.94	0.8	**2222 368 55684**	**2222 368 51684**
1	11	23	30	27.94	0.8	**2222 368 55105**	**2222 368 51105**

General data
2222 369 (MKT)

For detailed information on these and other types see Data Handbook C22

Rated capacitance (E–12 series)	0.001 to 0.22 μF
Upper tolerance on rated capacitance	− 10%
Lower tolerance on rated capacitance	+ 10%
Rated voltage U_R (d.c.)	100 V, 250 V, 400 V
Rated voltage U_R (a.c.), 50/60 Hz	63 V, 160 V, 220 V
Minimum category temperature	− 40 °C
Maximum category temperature	+ 100 °C
Climatic category	40/100/56
at norm	IEC 68
Related specification	IEC 384–2
performance grade	grade 1 (LL)
Dielectric	PETP



100 V–range

rated cap. μF	T_{max} mm	H_{max} mm	L_{max} mm	P mm	l = 4 mm cat. number	l = 22 mm cat. number
0.068	4	9.5	12.5	10.16	**2222 369 25683**	**2222 369 21683**
0.10	4	9.5	12.5	10.16	**2222 369 25104**	**2222 369 21104**
0.15	4	9.5	12.5	10.16	**2222 369 25154**	**2222 369 21154**
0.22	5	10.5	12.5	10.16	**2222 369 25224**	**2222 369 21224**

For detailed information on these and other types see Data Handbook C22

250 V–range

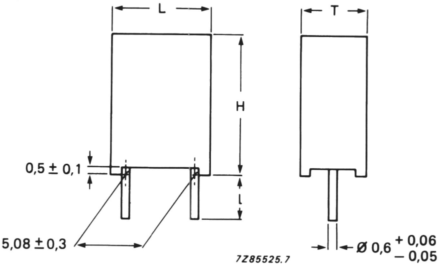
rated cap. µF	T_{max} mm	H_{max} mm	L_{max} mm	P mm	l = 4 mm cat. number	l = 22 mm cat. number
0.033	4	9.5	12.5	10.16	**2222 369 45333**	**2222 369 41333**
0.047	4	9.5	12.5	10.16	**2222 369 45473**	**2222 369 41473**
0.068	4.5	10	12.5	10.16	**2222 369 45683**	**2222 369 41683**
0.1	5	10.5	12.5	10.16	**2222 369 45104**	**2222 369 41104**

400 V–range

rated cap. µF	T_{max} mm	H_{max} mm	L_{max} mm	P mm	l = 4 mm cat. number	l = 22 mm cat. number
0.0010	4	9.5	12.5	10.16	**2222 369 55102**	**2222 369 51102**
0.0015	4	9.5	12.5	10.16	**2222 369 55152**	**2222 369 51152**
0.0022	4	9.5	12.5	10.16	**2222 369 55222**	**2222 369 51222**
0.0033	4	9.5	12.5	10.16	**2222 369 55332**	**2222 369 51332**
0.0047	4	9.5	12.5	10.16	**2222 369 55472**	**2222 369 51472**
0.0068	4	9.5	12.5	10.16	**2222 369 55682**	**2222 369 51682**
0.010	4	9.5	12.5	10.16	**2222 369 55103**	**2222 369 51103**
0.015	4	9.5	12.5	10.16	**2222 369 55153**	**2222 369 51153**
0.022	4	9.5	12.5	10.16	**2222 369 55223**	**2222 369 51223**
0.033	4.5	10	12.5	10.16	**2222 369 55333**	**2222 369 51333**

For details on these and other types see Data Handbook C22

Rated capacitance (E–12 series)	0.0047 to 1 µF
Upper tolerance on rated capacitance	− 10%
Lower tolerance on rated capacitance	+ 10%
Rated voltage U_R (d.c.)	63 V, 100 V
Rated voltage U_R (a.c.), 50/60 Hz	40 V, 63 V
Minimum category temperature	− 55 °C
Maximum category temperature	+ 100 °C
Climatic category (CECC 30400)	55/100/56
at norm	IEC 68
Related specification	IEC 384–2
performance grade	grade 1 (LL)
Dielectric	PETP



63 V–range

rated cap. µF	T_{max} mm	H_{max} mm	L_{max} mm	l = 4 mm cat. number	l = 25 mm cat. number	cat. number on reel*	cat. number ammo pack*
0.068	2.5	6.5	7.2	**2222 370 11683**	**2222 370 15683**	**2222 370 18683**	**2222 370 75683**
0.1	2.5	6.5	7.2	**2222 370 11104**	**2222 370 15104**	**2222 370 18104**	**2222 370 75104**
0.15	3.5	8	7.2	**2222 370 11154**	**2222 370 15154**	**2222 370 18154**	**2222 370 75154**
0.22	3.5	8	7.2	**2222 370 11224**	**2222 370 15224**	**2222 370 18224**	**2222 370 75224**
0.33	4.5	9	7.2	**2222 370 11334**	**2222 370 15334**	**2222 370 18334**	**2222 370 75334**
0.47	5	10	7.2	**2222 370 11474**	**2222 370 15474**	**2222 370 18474**	**2222 370 75474**
0.68	6	11	7.2	**2222 370 11684**	**2222 370 15684**	**2222 370 18684**	**2222 370 75684**
1	6	11	7.2	**2222 370 11105**	**2222 370 15105**	**2222 370 18105**	**2222 370 75105**

100 V–range

rated cap. µF	T_{max} mm	H_{max} mm	L_{max} mm	l = 4 mm cat. number	l = 25 mm cat. number	cat. number on reel*	cat. number ammo pack*
0.0047	2.5	6.5	7.2	**2222 370 21472**	**2222 370 25472**	**2222 370 28472**	**2222 370 85472**
0.0068	2.5	6.5	7.2	**2222 370 21682**	**2222 370 25682**	**2222 370 28682**	**2222 370 85682**
0.01	2.5	6.5	7.2	**2222 370 21103**	**2222 370 25103**	**2222 370 28103**	**2222 370 85103**
0.015	2.5	6.5	7.2	**2222 370 21153**	**2222 370 25153**	**2222 370 28153**	**2222 370 85153**
0.022	2.5	6.5	7.2	**2222 370 21223**	**2222 370 25223**	**2222 370 28223**	**2222 370 85223**
0.033	2.5	6.5	7.2	**2222 370 21333**	**2222 370 25333**	**2222 370 28333**	**2222 370 85333**
0.047	4.5	6.5	7.2	**2222 370 21473**	**2222 370 25473**	**2222 370 28473**	**2222 370 85473**
0.068	3.5	8	7.2	**2222 370 21683**	**2222 370 25683**	**2222 370 28683**	**2222 370 85683**
0.1	3.5	8	7.2	**2222 370 21104**	**2222 370 25104**	**2222 370 28104**	**2222 370 85104**

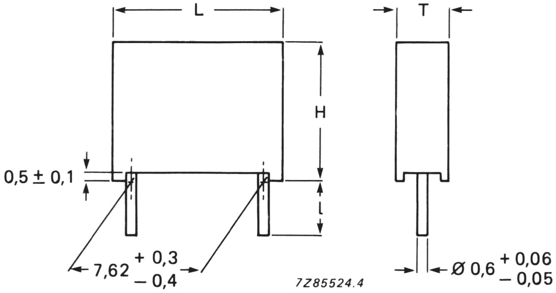
* H = 18 + 2

General data

2222 371 (MKT)

For detailed information on these and other types see Data Handbook C22

Rated capacitance (E–12 series)	0.0047 to 1 μF
Upper tolerance on rated capacitance	− 10%
Lower tolerance on rated capacitance	+ 10%
Rated voltage U_R (d.c.)	63 V, 100 V, 250 V, 400 V
Rated voltage U_R (a.c.), 50/60 Hz	40 V, 63 V, 160 V, 220 V
Minimum category temperature	− 55 °C
Maximum category temperature	+ 100 °C
Climatic category (CECC 30400)	55/100/56
at norm	IEC 68
Related specification	IEC 384–2
performance grade	grade 1 (LL)
Dielectric	PETP



63 V–range

rated cap. μF	T_{max} mm	H_{max} mm	L_{max} mm	l = 4 mm cat. number	l = 25 mm cat. number	cat. number on reel
0.068	2.5	6.5	10	**2222 371 11683**	**2222 371 15683**	**2222 371 18683**
0.1	2.5	6.5	10	**2222 371 11104**	**2222 371 15104**	**2222 371 18104**
0.15	3	8	10	**2222 371 11154**	**2222 371 15154**	**2222 371 18154**
0.22	3	8	10	**2222 371 11224**	**2222 371 15224**	**2222 371 18224**
0.33	4	9	10	**2222 371 11334**	**2222 371 15334**	**2222 371 18334**
0.47	4	9	10	**2222 371 11474**	**2222 371 15474**	**2222 371 18474**
0.68	5	10.5	10	**2222 371 11684**	**2222 371 15684**	**2222 371 18684**
1	6	11.5	10	**2222 371 11105**	**2222 371 15105**	**2222 371 18105**

For detailed information on these and other types see Data Handbook C22

100 V–range

rated cap. µF	T_{max} mm	H_{max} mm	L_{max} mm	l = 4 mm cat. number	l = 25 mm cat. number	cat. number on reel
0.022	2.5	6.5	10	**2222 371 21223**	**2222 371 25223**	**2222 371 28223**
0.033	2.5	6.5	10	**2222 371 21333**	**2222 371 25333**	**2222 371 28333**
0.047	2.5	6.5	10	**2222 371 21473**	**2222 371 25473**	**2222 371 28473**
0.068	3	8	10	**2222 371 21683**	**2222 371 25683**	**2222 371 28683**
0.1	3	8	10	**2222 371 21104**	**2222 371 25104**	**2222 371 28104**
0.15	4	9	10	**2222 371 21154**	**2222 371 25154**	**2222 371 28154**
0.22	4	9	10	**2222 371 21224**	**2222 371 25224**	**2222 371 28224**
0.33	5	10.5	10	**2222 371 21334**	**2222 371 25334**	**2222 371 28334**
0.47	6	11.5	10	**2222 371 21474**	**2222 371 25474**	**2222 371 28474**

250 V–range

rated cap. µF	T_{max} mm	H_{max} mm	L_{max} mm	l = 4 mm cat. number	l = 25 mm cat. number	cat. number on reel
0.01	2.5	6.5	10	**2222 371 41103**	**2222 371 45103**	**2222 371 48103**
0.015	2.5	6.5	10	**2222 371 41153**	**2222 371 45153**	**2222 371 48153**
0.022	3	8	10	**2222 371 41223**	**2222 371 45223**	**2222 371 48223**
0.033	3	8	10	**2222 371 41333**	**2222 371 45333**	**2222 371 48333**
0.047	3	8	10	**2222 371 41473**	**2222 371 45473**	**2222 371 48473**
0.068	5	10.5	10	**2222 371 41683**	**2222 371 45683**	**2222 371 48683**
0.1	6	11.5	10	**2222 371 41104**	**2222 371 45104**	**2222 371 48104**

400 V–range

rated cap. µF	T_{max} mm	H_{max} mm	L_{max} mm	l = 4 mm cat. number	l = 25 mm cat. number	cat. number on reel
0.0047	2.5	6	10	**2222 371 51472**	**2222 371 55472**	**2222 371 58472**
0.0068	2.5	6	10	**2222 371 51682**	**2222 371 55682**	**2222 371 58682**
0.01	3	8	10	**2222 371 51103**	**2222 371 55103**	**2222 371 58103**

POLYPROPYLENE FILM/FOIL CAPACITORS

General data
2222 460–464 (KP)

For detailed information on these and other types see Data Handbook C22

Rated capacitance (E–24 series and E–48 series)	47 to 62000 pF
Lower tolerance on rated capacitance	−2%
Upper tolerance on rated capacitance	+2%
Rated voltage U_R (d.c.)	63 V, 160 V, 250 V, 400 V, 630 V
Rated voltage U_R (a.c.), 50/60 Hz	40 V, 63 V, 125 V, 160 V, 200 V, 400 V
Minimum category temperature	−40 °C
Maximum category temperature	+100 °C
Climatic category	40/100/56
at norm	IEC 68
Related specification	IEC 384–13
Dielectric	PP

63 V–range

rated cap. pF	D_{max} mm	L_{max} mm	l_{min} mm	cat. number on reel	cat. number in box
6800	5	11	30	**2222 460 76802**	**2222 460 36802**
10000	5.5	15	28	**2222 460 71003**	**2222 460 31003**
15000	5.5	15	28	**2222 460 71503**	**2222 460 31503**
22000	5.5	15	28	**2222 460 72203**	**2222 460 32203**
33000	6.5	15	28	**2222 460 73303**	**2222 460 33303**
47000	7.5	15	28	**2222 460 74703**	**2222 460 34703**
62000	8	15	28	**2222 460 76203**	**2222 460 36203**

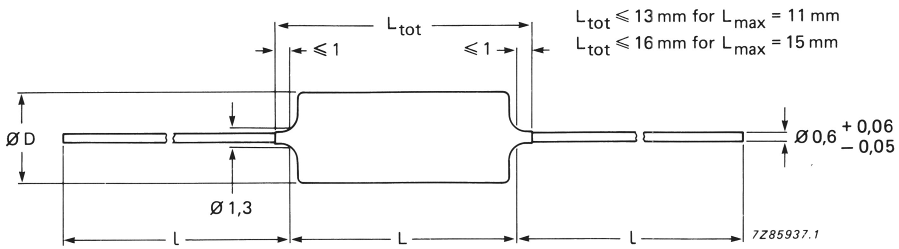
160 V–range

rated cap. pF	D_{max} mm	L_{max} mm	l_{min} mm	cat. number on reel	cat. number in box
4700	5	11	30	**2222 461 74702**	**2222 461 34702**
6800	5.5	15	28	**2222 461 76802**	**2222 461 36802**
10000	5.5	15	28	**2222 461 71003**	**2222 461 31003**
15000	5.5	15	28	**2222 461 71503**	**2222 461 31503**
22000	6.5	15	28	**2222 461 72203**	**2222 461 32203**
33000	7.5	15	28	**2222 461 73303**	**2222 461 33303**

250 V–range

rated cap. pF	D_{max} mm	L_{max} mm	l_{min} mm	cat. number on reel	cat. number in box
1500	5	11	30	**2222 462 71502**	**2222 462 31502**
2200	5	11	30	**2222 462 72202**	**2222 462 32202**
3300	5	11	30	**2222 462 73302**	**2222 462 33302**
4700	5.5	15	28	**2222 462 74702**	**2222 462 44702**
6800	5.5	15	28	**2222 462 76802**	**2222 462 46802**
10000	6	15	28	**2222 462 71003**	**2222 462 41003**
15000	7	15	28	**2222 462 71503**	**2222 462 41503**
22000	8	15	28	**2222 462 72203**	**2222 462 42203**

For detailed information on these and other types see Data Handbook C22


L_{tot}
≤ 1
≤ 1
$L_{tot} \leq 13$ mm for $L_{max} = 11$ mm
$L_{tot} \leq 16$ mm for $L_{max} = 15$ mm
ØD
$Ø0,6\ ^{+0,06}_{-0,05}$
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7Z85937.1

400 V–range

rated cap. pF	D_{max} mm	L_{max} mm	l_{min} mm	cat. number on reel	cat. number in box
150	5	11	30	**2222 463 71501**	**2222 463 31501**
220	5	11	30	**2222 463 72201**	**2222 463 32201**
330	5	11	30	**2222 463 73301**	**2222 463 33301**
470	5	11	30	**2222 463 74701**	**2222 463 34701**
680	5	11	30	**2222 463 76801**	**2222 463 36801**
1000	5	11	30	**2222 463 71001**	**2222 463 31001**

630 V–range

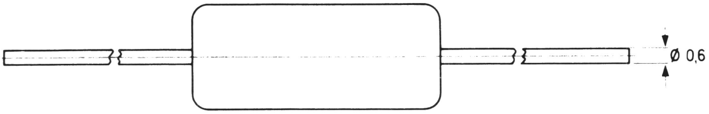
rated cap. pF	D_{max} mm	L_{max} mm	l_{min} mm	cat. number on reel	cat. number in box
47	5	11	30	**2222 464 74709**	**2222 464 34709**
68	5	11	30	**2222 464 76809**	**2222 464 36809**
100	5	11	30	**2222 464 71009**	**2222 464 31009**

POLYSTYRENE FILM/FOIL CAPACITORS

General data
2222 424–431 (KS)

For detailed information on these and other types see Data Handbook C22

Rated capacitance range	51 to 39000 pF
Tolerance on rated capacitance	± 1%, ± 2%, ± 5% (E24–series)
Rated voltage U_R (d.c.)	63 V, 160 V, 250 V, 630 V
Rated voltage U_R (a.c.), 50/60 Hz	25 V, 63 V, 125 V, 250 V
Temperature range:	
63 V version	−40 to +70 °C
160 V, 250 V, 630 V versions	−40 to +85 °C
Climatic category, IEC 68:	
63 V version	40/070/21
160 V, 250 V, 630 V versions	40/085/21
Related specification	IEC 384–7
Dielectric	polystyrene (KS)



Composition of the catalogue number

2222 *** *****

424 = 63 V
425 = 160 V
426 = 250 V
427 = 630 V

packed in boxes

428 = 63 V
429 = 160 V
430 = 250 V
431 = 630 V

packed on bandoliers on reels

2 = ±5%
3 = ±2%
4 = ±1%

6 = ±5%
7 = ±2%
8 = ±1%

first three figures of capacitance value in pF

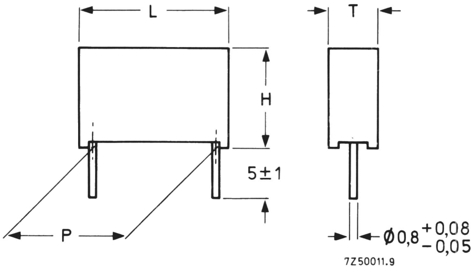
multiplying factor

1 = 1 x
2 = 10 x
3 = 100 x

A.C. & pulse metallized polypropylene film capacitors General data
2222 376 (KP/MMKP)

For detailed information on these and other types see Data Handbook C22

Rated capacitance (E–12 series)	1 to 270 nF
Lower tolerance on rated capacitance	−5%
Upper tolerance on rated capacitance	+5%
Rated voltage U_R (d.c.)	630 V, 1000 V, 1600 V, 2000 V
Rated voltage U_R (a.c.), 50/60 Hz	300 V, 400 V, 500 V, 600 V
Minimum category temperature	−55 °C
Maximum category temperature	+85 °C
Climatic category	55/100/56
Related specification	IEC 384–17
Dielectric	PP



630 V–range

rated cap. µF	T_{max} mm	H_{max} mm	L_{max} mm	P* mm	cat. number (tolerance ±5%)
0.0068	5	11	17.5	15	**2222 376 62682**
0.0082	5	11	17.5	15	**2222 376 62822**
0.01	6	12	17.5	15	**2222 376 62103**
0.012	6	12	17.5	15	**2222 376 62123**
0.015	7	13	17.5	15	**2222 376 62153**
0.018	7	13	17.5	15	**2222 376 62183**
0.022	8.5	14.5	17.5	15	**2222 376 62223**
0.027	6.5	15.5	26	22.5	**2222 376 62273**
0.033	7.5	16.5	26	22.5	**2222 376 62333**
0.039	7.5	16.5	26	22.5	**2222 376 62393**
0.047	8.5	17.5	26	22.5	**2222 376 62473**
0.056	9.5	19	26	22.5	**2222 376 62563**
0.068	11	20	31	27.5	**2222 376 62683**
0.082	11	20	31	27.5	**2222 376 62823**
0.1	11	20	31	27.5	**2222 376 62104**
0.12	13	22.5	31	27.5	**2222 376 62124**
0.15	13	22.5	31	27.5	**2222 376 62154**
0.18	15	25	31	27.5	**2222 376 62184**
0.22	18	28	31	27.5	**2222 376 62224**
0.27	18	28	31	27.5	**2222 376 62274**

* ± 0.3

For detailed information on these and other types see Data Handbook C22

1000 V–range

rated cap. µF	T_{max} mm	H_{max} mm	L_{max} mm	P* mm	cat. number (tolerance ±5%)
0.0047	5	11	17.5	15	**2222 376 72427**
0.0056	5	11	17.5	15	**2222 376 72512**
0.0068	6	12	17.5	15	**2222 376 72682**
0.0082	6	12	17.5	15	**2222 376 72822**
0.01	7	13	17.5	15	**2222 376 72103**
0.012	8.5	14.5	17.5	15	**2222 376 72123**
0.015	6.5	15.5	26	22.5	**2222 376 72153**
0.018	7.5	16.5	26	22.5	**2222 376 72183**
0.022	8.5	17.5	26	22.5	**2222 376 72223**
0.027	8.5	17.5	26	22.5	**2222 376 72273**
0.033	8.5	17.5	26	22.5	**2222 376 72333**
0.039	9.5	19	26	22.5	**2222 376 72393**
0.047	11	20	31	27.5	**2222 376 72473**
0.056	11	20	31	27.5	**2222 376 72563**
0.068	11	20	31	27.5	**2222 376 72683**
0.082	13	22.5	31	27.5	**2222 376 72823**
0.1	13	22.5	31	27.5	**2222 376 72104**
0.12	15	25	31	27.5	**2222 376 72124**
0.15	18	28	31	27.5	**2222 376 72154**
0.18	18	28	31	27.5	**2222 376 72184**

* ± 0.3

For detailed information on these and other types see Data Handbook C22

1600 V–range

rated cap. μF	T_{max} mm	H_{max} mm	L_{max} mm	P* mm	cat. number (tolerance ±5%)
0.0018	5	11	17.5	15	**2222 376 82182**
0.0022	6	12	17.5	15	**2222 376 82222**
0.0027	7	13	17.5	15	**2222 376 82272**
0.0033	7	13	17.5	15	**2222 376 82332**
0.0039	8.5	14.5	17.5	15	**2222 376 82392**
0.0047	8.5	14.5	17.5	15	**2222 376 82472**
0.0068	6.5	15.5	26	22.5	**2222 376 82682**
0.0082	6.5	15.5	26	22.5	**2222 376 82822**
0.01	7.5	16.5	26	22.5	**2222 376 82103**
0.012	8.5	17.5	26	22.5	**2222 376 82123**
0.015	9.5	19	26	22.5	**2222 376 82153**
0.018	11	20	31	27.5	**2222 376 82183**
0.022	11	20	31	27.5	**2222 376 82223**
0.027	13	22.5	31	27.5	**2222 376 82273**
0.033	13	22.5	31	27.5	**2222 376 82333**
0.039	15	25	31	27.5	**2222 376 82393**
0.047	18	28	31	27.5	**2222 376 82473**
0.056	18	28	31	27.5	**2222 376 82563**

2000 V–range

rated cap. μF	T_{max} mm	H_{max} mm	L_{max} mm	P* mm	cat. number (tolerance ±5%)
0.001	5	11	17.5	15	**2222 376 92102**
0.0012	6	12	17.5	15	**2222 376 92122**
0.0015	6	12	17.5	15	**2222 376 92152**
0.0018	7	13	17.5	15	**2222 376 92182**
0.0022	8.5	14.5	17.5	15	**2222 376 92222**
0.0027	8.5	14.5	26	22.5	**2222 376 92272**
0.0033	6.5	15.5	26	22.5	**2222 376 92332**
0.0039	6.5	15.5	26	22.5	**2222 376 92392**
0.0047	6.5	15.5	26	22.5	**2222 376 92472**
0.0056	7.5	16.5	26	22.5	**2222 376 92562**
0.0068	7.5	16.5	26	22.5	**2222 376 92682**
0.0082	8.5	17.5	26	22.5	**2222 376 92822**
0.01	9.5	19	26	22.5	**2222 376 92103**
0.012	11	20	31	27.5	**2222 376 92123**
0.015	11	20	31	27.5	**2222 376 92153**
0.018	13	22.5	31	27.5	**2222 376 92183**
0.022	13	22.5	31	27.5	**2222 376 92223**
0.027	15	25	31	27.5	**2222 376 92273**
0.033	18	28	31	27.5	**2222 376 92333**

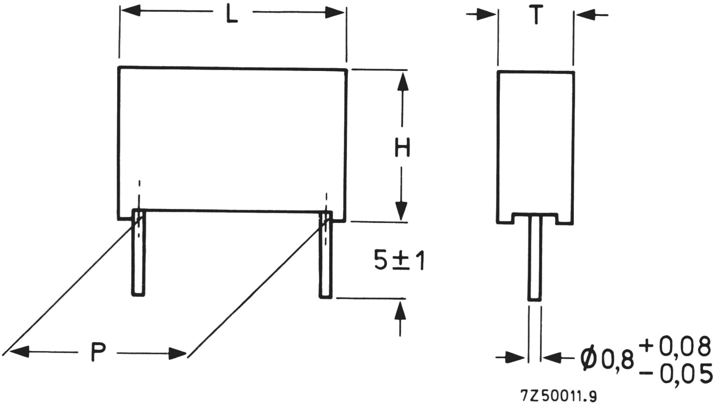
* ± 0.3

A.C. & pulse metallized polypropylene film capacitors General data

2222 378 (MKP)

For detailed information on these and other types see Data Handbook C22

Rated capacitance (E–12 series)	0.0033 to 3.3 µF
Lower tolerance on rated capacitance	− 5%
Upper tolerance on rated capacitance	+ 5%
Rated voltage U_R (d.c.)	250 V, 400 V, 630 V, 1000 V, 1600 V, 2000 V
Rated voltage U_R (a.c.), 50/60 Hz	160 V, 200 V, 300 V, 400 V, 500 V, 600 V
Minimum category temperature	− 55 °C
Maximum category temperature	+ 85 °C
Climatic category	55/100/56
Related specification	IEC 384–17
Dielectric	PP
Performance grade	grade 1 (LL)



250 V–range

rated cap. µF	T_{max} mm	H_{max} mm	L_{max} mm	P* mm	cat. number (tolerance ± 5%)
0.33	7	16.5	26	22.5	**2222 378 42334**
0.39	7	16.5	26	22.5	**2222 378 42394**
0.47	8.5	18	26	22.5	**2222 378 42474**
0.56	8.5	18	26	22.5	**2222 378 42564**
0.68	10	19.5	26	22.5	**2222 378 42684**
0.82	10	19.5	26	22.5	**2222 378 42824**
1	11	21	31	27.5	**2222 378 42105**
1.2	11	21	31	27.5	**2222 378 42125**
1.5	13	23	31	27.5	**2222 378 42255**
1.8	13	23	31	27.5	**2222 378 42185**
2.2	15	25	31	27.5	**2222 378 42225**
2.7	18	28	31	27.5	**2222 378 42275**
3.3	18	28	31	27.5	**2222 378 42335**

* ± 0.4

For detailed information on these and other types see Data Handbook C22

400 V–range

rated cap. µF	T_{max} mm	H_{max} mm	L_{max} mm	P* mm	cat. number (tolerance ±5%)
0.18	6	15.5	26	22.5	**2222 378 52184**
0.22	7	16.5	26	22.5	**2222 378 52224**
0.27	8.5	18	26	22.5	**2222 378 52274**
0.33	8.5	18	26	22.5	**2222 378 52334**
0.39	10	19.5	26	22.5	**2222 378 52394**
0.47	10	19.5	26	22.5	**2222 378 52474**
0.56	11	21	31	27.5	**2222 378 52564**
0.68	11	21	31	27.5	**2222 378 52684**
0.82	13	23	31	27.5	**2222 378 52824**
1	13	23	31	27.5	**2222 378 52105**
1.2	15	25	31	27.5	**2222 378 52125**
1.5	18	28	31	27.5	**2222 378 52155**
1.8	18	28	31	27.5	**2222 378 52185**

630 V–range

rated cap. µF	T_{max} mm	H_{max} mm	L_{max} mm	P* mm	cat. number (tolerance ±5%)
0.056	6	15.5	26	22.5	**2222 378 62563**
0.068	6	15.5	26	22.5	**2222 378 62683**
0.082	7	16.5	26	22.5	**2222 378 62823**
0.1	7	16.5	26	22.5	**2222 378 62104**
0.12	8.5	18	26	22.5	**2222 378 62124**
0.15	8.5	18	26	22.5	**2222 378 62154**
0.18	10	19.5	26	22.5	**2222 378 62184**
0.22	11	21	31	27.5	**2222 378 62224**
0.27	11	21	31	27.5	**2222 378 62274**
0.33	13	21	31	27.5	**2222 378 62334**
0.39	13	23	31	27.5	**2222 378 62394**
0.47	15	25	31	27.5	**2222 378 62474**
0.56	18	28	31	27.5	**2222 378 62564**
0.68	18	28	31	27.5	**2222 378 62684**

* ±0.3

A.C. & pulse metallized polypropylene film capacitors General data

2222 378 (MKP) cont.

For detailed information on these and other types see Data Handbook C22

1000 V–range

rated cap. µF	T_{max} mm	H_{max} mm	L_{max} mm	P* mm	cat. number (tolerance ±5%)
0.012	6	15.5	26	22.5	**2222 378 72123**
0.015	6	15.5	26	22.5	**2222 378 72153**
0.018	6	15.5	26	22.5	**2222 378 72183**
0.022	7	16.5	26	22.5	**2222 378 72224**
0.027	7	16.5	26	22.5	**2222 378 72273**
0.033	8.5	18	26	22.5	**2222 378 72333**
0.039	8.5	18	26	22.5	**2222 378 72393**
0.047	10	19.5	26	22.5	**2222 378 72473**
0.056	11	21	31	27.5	**2222 378 72563**
0.068	11	21	31	27.5	**2222 378 72683**
0.082	11	21	31	27.5	**2222 378 72823**
0.1	13	23	31	27.5	**2222 378 72104**
0.12	15	25	31	27.5	**2222 378 72124**
0.15	15	25	31	27.5	**2222 378 72154**
0.18	18	28	31	27.5	**2222 378 72184**
0.22	18	28	31	27.5	**2222 378 72224**

1600 V–range

rated cap. µF	T_{max} mm	H_{max} mm	L_{max} mm	P* mm	cat. number (tolerance ±5%)
0.0056	6	15.5	26	22.5	**2222 378 82562**
0.0068	6	15.5	26	22.5	**2222 378 82682**
0.0082	7	16.5	26	22.5	**2222 378 82822**
0.01	7	16.5	26	22.5	**2222 378 82103**
0.012	8.5	18	26	22.5	**2222 378 82123**
0.015	8.5	18	26	22.5	**2222 378 82153**
0.018	10	19.5	26	22.5	**2222 378 82183**
0.022	10	19.5	26	22.5	**2222 378 82223**
0.027	11	21	31	27.5	**2222 378 82273**
0.033	11	21	31	27.5	**2222 378 82333**
0.039	13	23	31	27.5	**2222 378 82393**
0.047	13	23	31	27.5	**2222 378 82473**
0.056	15	25	31	27.5	**2222 378 82563**
0.068	15	25	31	27.5	**2222 378 82683**
0.082	18	28	31	27.5	**2222 378 82823**
0.1	18	28	31	27.5	**2222 378 82104**

* ±0.3

For detailed information on these and other types see Data Handbook C22

2000 V–range

rated cap. µF	T_{max} mm	H_{max} mm	L_{max} mm	P* mm	cat. number (tolerance ±5%)
0.0033	6	15.5	26	22.5	**2222 378 92332**
0.0039	6	15.5	26	22.5	**2222 378 92392**
0.0047	7	16.5	26	22.5	**2222 378 92472**
0.0056	7	16.5	26	22.5	**2222 378 92562**
0.0068	8.5	18	26	22.5	**2222 378 92682**
0.0082	8.5	18	26	22.5	**2222 378 92822**
0.01	10	19.5	26	22.5	**2222 378 92103**
0.012	10	19.5	26	22.5	**2222 378 92123**
0.015	11	21	31	27.5	**2222 378 92153**

MINIATURE CERAMIC CAPACITORS

General data
2222 629 (K14000)

For detailed information on these and other types see Data Handbook C15
For packing information see page C79

Capacitance range	1000 to 47000 pF
Lower tolerance	−20%
Upper tolerance	+80%
Rated d.c. voltage	63 V
Sectional specification	IEC 384–9
Class	2
Climatic category	10/055/21
at norm	IEC 68
Colour code	green

size	W_{max} mm	H_{max} (mm)		L (mm)	
		fig. 1	fig. 2	short leads	long leads
I	3.6	6.3	5.0	4 ± 0.5	⩾ 13
IIB	4.5	7.3	6.0	4 ± 0.5	⩾ 13
IV	6.2	9.0	7.7	4 ± 0.5	⩾ 13
V	6.2	11.2	9.9	4 ± 0.5	⩾ 13

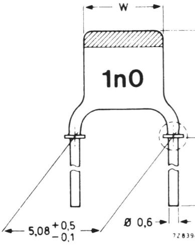


Fig. 1

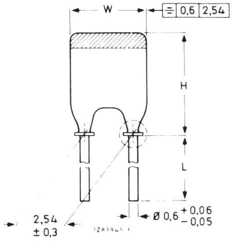


Fig. 2

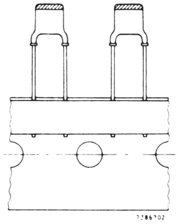


Fig. 3

cap. pF	size	cat.no. lead spacing 0.2" long leads,fig.2 bulk	cat.no. lead spacing 0.2" short leads,fig.1 bulk	cat.no. lead spacing 0.2" on tape on reel fig. 3	cat.no. lead spacing 0.1" on tape in ammopack,fig.3
1000	I	**2222 629 08102**	**2222 629 19102**	**2222 629 53102**	**2222 629 63102**
2200	I	**2222 629 08222**	**2222 629 19222**	**2222 629 53222**	**2222 629 63222**
4700	I	**2222 629 08472**	**2222 629 19472**	**2222 629 53472**	**2222 629 63472**
10000	IIB	**2222 629 08103**	**2222 629 19103**	**2222 629 53103**	**2222 629 63103**
22000	IV	**2222 629 08223**	**2222 629 19223**	**2222 629 53223**	**2222 629 63223**
47000	V	**2222 629 08473**	**2222 629 19473**	**2222 629 53473**	**2222 629 63473**

MINIATURE CERAMIC CAPACITORS (cont.)

General data
2222 630 (K2000)

For detailed information on these and other types see Data Handbook C15
For packing information see page C79

Capacitance range	180 to 6800 pF
Lower tolerance	−10%
Upper tolerance	+10%
Rated d.c. voltage	100 V
Sectional specification	IEC 384–9/2C2
Class	2
Climatic category	55/085/21
at norm	IEC 68
Colour code	yellow

size	W_{max} mm	H_{max} (mm)		L (mm)	
		fig. 1	fig. 2	short leads	long leads
I	3.6	6.3	5.0	4 ± 0.5	⩾ 13
IIA	3.9	6.7	5.3	4 ± 0.5	⩾ 13
IIB	4.5	7.3	6.0	4 ± 0.5	⩾ 13
III	5.1	7.9	6.6	4 ± 0.5	⩾ 13
IV	6.2	9.0	7.7	4 ± 0.5	⩾ 13
V	6.2	11.2	9.9	4 ± 0.5	⩾ 13

For Figs 1, 2 and 3 see page C72.

cap. pF	size	cat.no. lead spacing 0.2" long leads,fig.2 bulk	cat.no. lead spacing 0.2" short leads,fig.1 bulk	cat.no. lead spacing 0.2" on tape on reel fig. 3	cat.no. lead spacing 0.1" on tape in ammopack,fig.3
180	I	**2222 630 08181**	**2222 630 19181**	**2222 630 53181**	**2222 630 63181**
220	I	**2222 630 08221**	**2222 630 19221**	**2222 630 53221**	**2222 630 63221**
270	I	**2222 630 08271**	**2222 630 19271**	**2222 630 53271**	**2222 630 63271**
330	I	**2222 630 08331**	**2222 630 19331**	**2222 630 53331**	**2222 630 63331**
390	I	**2222 630 08391**	**2222 630 19391**	**2222 630 53391**	**2222 630 63391**
470	I	**2222 630 08471**	**2222 630 19471**	**2222 630 53471**	**2222 630 63471**
560	I	**2222 630 08561**	**2222 630 19561**	**2222 630 53561**	**2222 630 63561**
680	I	**2222 630 08681**	**2222 630 19681**	**2222 630 53681**	**2222 630 63681**
820	I	**2222 630 08821**	**2222 630 19821**	**2222 630 53821**	**2222 630 63821**
1000	IIA	**2222 630 08102**	**2222 630 19102**	**2222 630 53102**	**2222 630 63102**
1200	IIA	**2222 630 08122**	**2222 630 19122**	**2222 630 53122**	**2222 630 63122**
1500	IIB	**2222 630 08152**	**2222 630 19152**	**2222 630 53152**	**2222 630 63152**
1800	IIB	**2222 630 08182**	**2222 630 19182**	**2222 630 53182**	**2222 630 63182**
2200	III	**2222 630 08222**	**2222 630 19222**	**2222 630 53222**	**2222 630 63222**
2700	III	**2222 630 08272**	**2222 630 19272**	**2222 630 53272**	**2222 630 63272**
3300	IV	**2222 630 08332**	**2222 630 19332**	**2222 630 53332**	**2222 630 63332**
3900	IV	**2222 630 08392**	**2222 630 19392**	**2222 630 53392**	**2222 630 63392**
4700	IV	**2222 630 08472**	**2222 630 19472**	**2222 630 53472**	**2222 630 63472**
5600	V	**2222 630 08562**	**2222 630 19562**	**2222 630 53562**	**2222 630 63562**
6800	V	**2222 630 08682**	**2222 630 19682**	**2222 630 53682**	**2222 630 63682**

MINIATURE CERAMIC CAPACITORS (cont.)

General data
2222 680/683/679/689 (P100)

For detailed information on these and other types see Data Handbook C15
For packing information see page C79

Capacitance range	0.56 to 1.5 pF
Lower tolerance	−0.25 pF
Upper tolerance	+0.25 pF
Rated d.c. voltage	100 V
Temperature coefficient	100×10^{-6}/K
Sectional specification	IEC 384–8/1B
Class	1
Climatic category	55/085/21
at norm	IEC 68
Colour code	red–violet

size	W_{max} mm	H_{max} (mm)		L (mm)	
		fig. 1	fig. 2	short leads	long leads
I	3.6	6.3	5.0	4 ± 0.5	⩾ 13

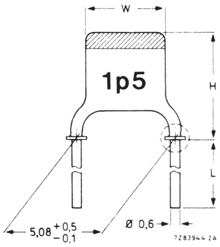


Fig. 1

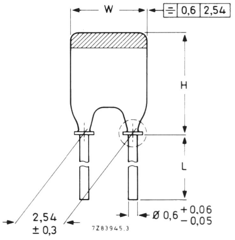


Fig. 2

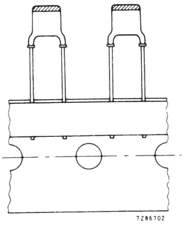


Fig. 3

cap. pF	tole–rance ± pF	size	cat.no. lead spacing 0.1" long leads,fig.2 bulk	cat.no. lead spacing 0.2" short leads,fig.1 bulk	cat.no. lead spacing 0.2" on tape on reel fig.3	cat.no. lead spacing 0.2" in ammopack fig. 3
0.56	0.25	I	**2222 680 03567**	**2222 683 03567**	**2222 679 03567**	**2222 689 03567**
0.68	0.25	I	**2222 680 03687**	**2222 683 03687**	**2222 679 03687**	**2222 689 03687**
0.82	0.25	I	**2222 680 03827**	**2222 683 03827**	**2222 679 03827**	**2222 689 03827**
1	0.25	I	**2222 680 03108**	**2222 683 03108**	**2222 679 03108**	**2222 689 03108**
1.2	0.25	I	**2222 680 03128**	**2222 683 03128**	**2222 679 03128**	**2222 689 03128**
1.5	0.25	I	**2222 680 03158**	**2222 683 03158**	**2222 679 03158**	**2222 689 03158**

MINIATURE CERAMIC CAPACITORS (cont.)

General data
2222 680/683/679/689 (NPO)

For details on these and other types see Data Handbook C15
For packing information see page C79

Capacitance range	1.8 to 220 pF	Sectional specification	IEC 384–8, class 1B
Tolerance	± 2% or ± 0.25 pF	Climatic category, IEC 68	55/085/21
Rated d.c. voltage	100 V	Colour code	black
Temperature coefficient	NPO (0 x 10^{-6}/K)		

size	W_{max} mm	H_{max} (mm)		L (mm)	
		fig. 1	fig. 2	short leads	long leads
I	3.6	6.3	5.0	4 ± 0.5	⩾ 13
IIA	3.9	6.7	5.3	4 ± 0.5	⩾ 13
IIB	4.5	7.3	6.0	4 ± 0.5	⩾ 13
III	5.1	7.9	6.6	4 ± 0.5	⩾ 13
IV	6.2	9	7.7	4 ± 0.5	⩾ 13
V	6.2	11.2	9.9	4 ± 0.5	⩾ 13

For drawing see next page.

cap. pF	tole–rance ± pF/%	size	cat.no. lead spacing 0.1" long leads,fig.2 bulk	cat.no. lead spacing 0.2" short leads,fig.1 bulk	cat.no. lead spacing 0.2" on tape on reel fig.3	cat.no. lead spacing 0.2" in ammopack fig. 3
1.8	0.25	I	**2222 680 09188**	**2222 683 09188**	**2222 679 09188**	**2222 689 09188**
2.2	0.25	I	**2222 680 09228**	**2222 683 09228**	**2222 679 09228**	**2222 689 09228**
2.7	0.25	I	**2222 680 09278**	**2222 683 09278**	**2222 679 09278**	**2222 689 09278**
3.3	0.25	I	**2222 680 09338**	**2222 683 09338**	**2222 679 09338**	**2222 689 09338**
4.7	0.25	I	**2222 680 09478**	**2222 683 09478**	**2222 679 09478**	**2222 689 09478**
5.6	0.25	I	**2222 680 09568**	**2222 683 09568**	**2222 679 09568**	**2222 689 09568**
6.8	0.25	I	**2222 680 09688**	**2222 683 09688**	**2222 679 09688**	**2222 689 09688**
8.2	0.25	I	**2222 680 09828**	**2222 683 09828**	**2222 679 09828**	**2222 689 09828**
10	2%	I	**2222 680 10109**	**2222 683 10109**	**2222 679 10109**	**2222 689 10109**
12	2%	I	**2222 680 10129**	**2222 683 10129**	**2222 679 10129**	**2222 689 10129**
15	2%	I	**2222 680 10159**	**2222 683 10159**	**2222 679 10159**	**2222 689 10159**
18	2%	I	**2222 680 10189**	**2222 683 10189**	**2222 679 10189**	**2222 689 10189**
22	2%	I	**2222 680 10229**	**2222 683 10229**	**2222 679 10229**	**2222 689 10229**
27	2%	I	**2222 680 10279**	**2222 683 10279**	**2222 679 10279**	**2222 689 10279**
33	2%	I	**2222 680 10339**	**2222 683 10339**	**2222 679 10339**	**2222 689 10339**
39	2%	IIA	**2222 680 10399**	**2222 683 10399**	**2222 679 10399**	**2222 689 10399**
47	2%	IIA	**2222 680 10479**	**2222 683 10479**	**2222 679 10479**	**2222 689 10479**
56	2%	IIB	**2222 680 10569**	**2222 683 10569**	**2222 679 10569**	**2222 689 10569**
68	2%	IIB	**2222 680 10689**	**2222 683 10689**	**2222 679 10689**	**2222 689 10689**
82	2%	IIB	**2222 680 10829**	**2222 683 10829**	**2222 679 10829**	**2222 689 10829**
100	2%	III	**2222 680 10101**	**2222 683 10101**	**2222 679 10101**	**2222 689 10101**
120	2%	III	**2222 680 10121**	**2222 683 10121**	**2222 679 10121**	**2222 689 10121**
150	2%	IV	**2222 680 10151**	**2222 683 10151**	**2222 679 10151**	**2222 689 10151**
180	2%	IV	**2222 680 10181**	**2222 683 10181**	**2222 679 10181**	**2222 689 10181**
220	2%	V	**2222 680 10221**	**2222 683 10221**	**2222 679 10221**	**2222 689 10221**

MINIATURE CERAMIC CAPACITORS (cont.)

General data
2222 680/683/679/689 (N150)

For detailed information on these and other types see Data Handbook C15
For packing information see page C79

Capacitance range	3.9 to 150 pF	Sectional specification	IEC 384–8, class 1B
Tolerance	± 2% or ± 0.25 pF	Climatic category, IEC 68	55/085/21
Rated d.c. voltage	100 V	Colour code	orange
Temperature coefficient	N150 (–150 x 10^{-6}/K)		

size	W_{max} mm	H_{max} (mm) fig. 1	H_{max} (mm) fig. 2	L (mm) short leads	L (mm) long leads
I	3.6	6.3	5.0	4 ± 0.5	⩾ 13
IIA	3.9	6.7	5.3	4 ± 0.5	⩾ 13
IIB	4.5	7.3	6.0	4 ± 0.5	⩾ 13
III	5.1	7.9	6.6	4 ± 0.5	⩾ 13
IV	6.2	9.0	7.7	4 ± 0.5	⩾ 13

Fig. 1

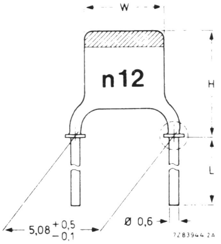


Fig. 2

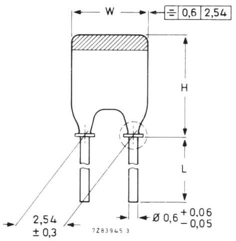
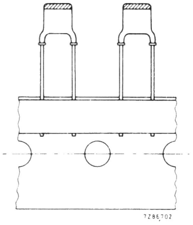


Fig. 3



cap. pF	tole–rance ± pF/%	size	cat.no. lead spacing 0.1" long leads,fig.2 bulk	cat.no. lead spacing 0.2" short leads,fig.1 bulk	cat.no. lead spacing 0.2" on tape on reel fig.3	cat.no. lead spacing 0.2" in ammopack fig. 3
3.9	0.25	I	**2222 680 33398**	**2222 683 33398**	**2222 679 33398**	**2222 689 33398**
4.7	0.25	I	**2222 680 33478**	**2222 683 33478**	**2222 679 33478**	**2222 689 33478**
5.6	0.25	I	**2222 680 33568**	**2222 683 33568**	**2222 679 33568**	**2222 689 33568**
6.8	0.25	I	**2222 680 33688**	**2222 683 33688**	**2222 679 33688**	**2222 689 33688**
8.2	0.25	I	**2222 680 33828**	**2222 683 33828**	**2222 679 33828**	**2222 689 33828**
10	2%	I	**2222 680 34109**	**2222 683 34109**	**2222 679 34109**	**2222 689 34109**
12	2%	I	**2222 680 34129**	**2222 683 34129**	**2222 679 34129**	**2222 689 34129**
15	2%	I	**2222 680 34159**	**2222 683 34159**	**2222 679 34159**	**2222 689 34159**
18	2%	I	**2222 680 34189**	**2222 683 34189**	**2222 679 34189**	**2222 689 34189**
22	2%	I	**2222 680 34229**	**2222 683 34229**	**2222 679 34229**	**2222 689 34229**
27	2%	I	**2222 680 34279**	**2222 683 34279**	**2222 679 34279**	**2222 689 34279**
33	2%	I	**2222 680 34339**	**2222 683 34339**	**2222 679 34339**	**2222 689 34339**
39	2%	IIA	**2222 680 34399**	**2222 683 34399**	**2222 679 34399**	**2222 689 34399**
47	2%	IIA	**2222 680 34479**	**2222 683 34479**	**2222 679 34479**	**2222 689 34479**
56	2%	IIB	**2222 680 34569**	**2222 683 34569**	**2222 679 34569**	**2222 689 34569**
68	2%	IIB	**2222 680 34689**	**2222 683 34689**	**2222 679 34689**	**2222 689 34689**
82	2%	III	**2222 680 34829**	**2222 683 34829**	**2222 679 34829**	**2222 689 34829**
100	2%	III	**2222 680 34101**	**2222 683 34101**	**2222 679 34101**	**2222 689 34101**
120	2%	IV	**2222 680 34121**	**2222 683 34121**	**2222 679 34121**	**2222 689 34121**
150	2%	IV	**2222 680 34151**	**2222 683 34151**	**2222 679 34151**	**2222 689 34151**

MINIATURE CERAMIC CAPACITORS (cont.)

General data
2222 680/683/679/689 (N750)

For details on these and other types see Data Handbook C15
For packing information see page C79

Capacitance range	3.9 to 330 pF
Tolerance	± 2% or ± 0,25 pF
Rated d.c. voltage	100 V
Temperature coefficient	N750 (–750 x 10^{-6}/K)
Sectional specification	IEC 384–8, class 1B
Climatic category, IEC 68	55/085/21
Colour code	violet

size	W_{max} mm	H_{max} (mm)		L (mm)	
		fig. 1	fig. 2	long leads	short leads
I	3.6	6.3	5.0	4 ± 0.5	⩾ 13
IIA	3.9	6.7	5.3	4 ± 0.5	⩾ 13
IIB	4.5	7.3	6.0	4 ± 0.5	⩾ 13
III	5.1	7.9	6.6	4 ± 0.5	⩾ 13
IV	6.2	9.0	7.7	4 ± 0.5	⩾ 13
V	6.2	11.2	9.9	4 ± 0.5	⩾ 13

For drawing see next page.

cap. pF	tole–rance ± pF/%	size	cat. number lead spacing 0.1" long leads, fig. 2, bulk packing	cat. number lead spacing 0.2" short leads, fig. 1, bulk packing	cat. number lead spacing 0.2" on tape/reel, fig. 3	cat. number lead spacing 0.2" on tape in ammopack fig. 3
3.9	0.25	I	**2222 680 57398**	**2222 683 57398**	**2222 679 57398**	**2222 689 57398**
4.7	0.25	I	**2222 680 57478**	**2222 683 57478**	**2222 679 57478**	**2222 689 57478**
5.6	0.25	I	**2222 680 57568**	**2222 683 57568**	**2222 679 57568**	**2222 689 57568**
6.8	0.25	I	**2222 680 57688**	**2222 683 57688**	**2222 679 57688**	**2222 689 57688**
8.2	0.25	I	**2222 680 57828**	**2222 683 57828**	**2222 679 57828**	**2222 689 57828**
10	2%	I	**2222 680 58109**	**2222 683 58109**	**2222 679 58109**	**2222 689 58109**
12	2%	I	**2222 680 58129**	**2222 683 58129**	**2222 679 58129**	**2222 689 58129**
15	2%	I	**2222 680 58159**	**2222 683 58159**	**2222 679 58159**	**2222 689 58159**
18	2%	I	**2222 680 58189**	**2222 683 58189**	**2222 679 58189**	**2222 689 58189**
22	2%	I	**2222 680 58229**	**2222 683 58229**	**2222 679 58229**	**2222 689 58229**
27	2%	I	**2222 680 58279**	**2222 683 58279**	**2222 679 58279**	**2222 689 58279**
33	2%	I	**2222 680 58339**	**2222 683 58339**	**2222 679 58339**	**2222 689 58339**
39	2%	I	**2222 680 58399**	**2222 683 58399**	**2222 679 58399**	**2222 689 58399**
47	2%	I	**2222 680 58479**	**2222 683 58479**	**2222 679 58479**	**2222 689 58479**
56	2%	IIA	**2222 680 58569**	**2222 683 58589**	**2222 679 58569**	**2222 689 58569**
68	2%	IIA	**2222 680 58689**	**2222 683 58689**	**2222 679 58689**	**2222 689 58689**
82	2%	IIB	**2222 680 58829**	**2222 683 58829**	**2222 679 58829**	**2222 689 58829**
100	2%	IIB	**2222 680 58101**	**2222 683 58101**	**2222 679 58101**	**2222 689 58101**
120	2%	III	**2222 680 58121**	**2222 683 58121**	**2222 679 58121**	**2222 689 58121**
150	2%	III	**2222 680 58151**	**2222 683 58151**	**2222 679 58151**	**2222 689 58151**
180	2%	IV	**2222 680 58181**	**2222 683 58181**	**2222 679 58181**	**2222 689 58181**
220	2%	IV	**2222 680 58221**	**2222 683 58221**	**2222 679 58221**	**2222 689 58221**
270	2%	V	**2222 680 58271**	**2222 683 58271**	**2222 679 58271**	**2222 689 58271**
330	2%	V	**2222 680 58331**	**2222 683 58331**	**2222 679 58331**	**2222 689 58331**

2222 680/683/679/689 (N1500)

For detailed information on these and other types see Data Handbook C15
For packing information see page C79

Capacitance range	390 to 560 pF
Tolerance	± 2%
Rated d.c. voltage	100 V
Temperature coefficient	N1500 (-1500×10^{-6}/K)
Sectional specification	IEC 384–8, class 1B
Climatic category, IEC 68	55/085/21
Colour code	orange/orange

size	W_{max} mm	H_{max} (mm) fig. 1	H_{max} (mm) fig. 2	L (mm) short leads	L (mm) long leads
IV	6.2	9.0	7.7	4 ± 0.5	⩾ 13
V	6.2	11.2	8.9	4 ± 0.5	⩾ 13

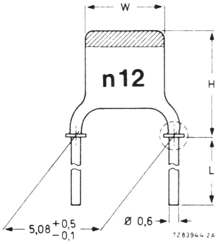


Fig. 1

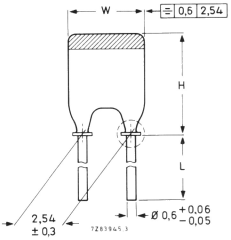


Fig. 2

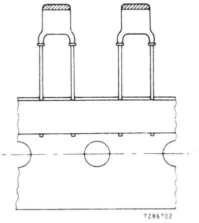


Fig. 3

cap. pF	tole– rance ± %	size	cat.no. lead spacing 0.1" long leads,fig.2 bulk	cat.no. lead spacing 0.2" short leads,fig.1 bulk	cat.no. lead spacing 0.2" on tape on reel fig.3	cat.no. lead spacing 0.2" in ammopack fig. 3
390	2%	IV	**2222 680 70391**	**2222 683 70391**	**2222 679 70391**	**2222 689 70391**
470	2%	V	**2222 680 70471**	**2222 683 70471**	**2222 679 70471**	**2222 689 70471**
560	2%	V	**2222 680 70561**	**2222 683 70561**	**2222 679 70561**	**2222 689 70561**

Packing information

For detailed information see Data Handbook C15

The miniature ceramic capacitors are supplied in bulk packing, on tape on reel, and on tape in ammopack.
Bulk packing: boxes of 1000 (sizes I, IIA, IIB, III) or 500 capacitors (sizes IV, V).
On tape on reel: 4000 capacitors per reel; see also Figs. 1 and 2
On tape in ammopack: 4000 capacitors per box, see also Figs. 1 and 3.

Fig. 1

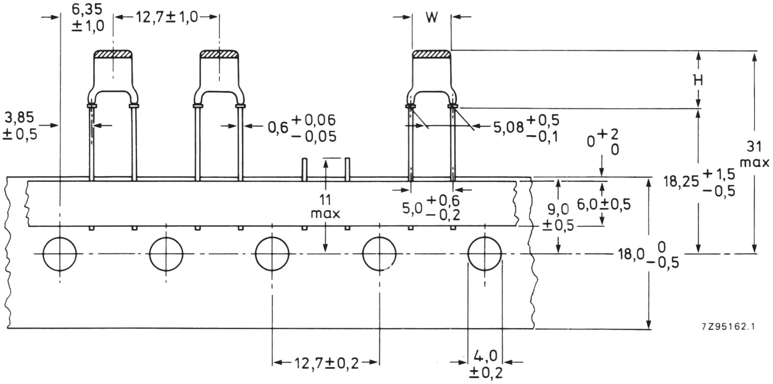

6,35 ±1,0
12,7±1,0
W
H
31 max
3,85 ±0,5
0,6 +0,06 −0,05
5,08 +0,5 −0,1
0 +2 0
18,25 +1,5 −0,5
11 max
5,0 +0,6 −0,2
9,0 ±0,5
6,0±0,5
18,0 0 −0,5
7Z95162.1
12,7±0,2
4,0 ±0,2

Fig. 2

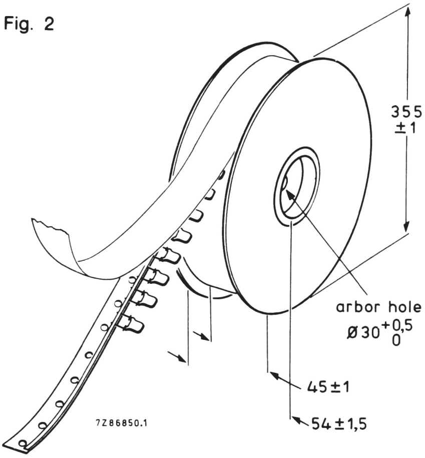
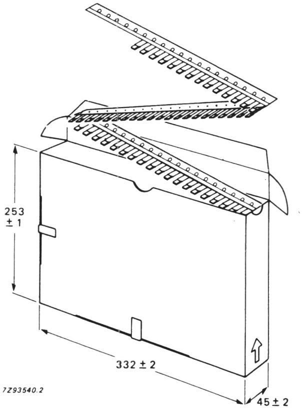

355 ±1
arbor hole
Ø30 +0,5 0
45±1
54±1,5
7Z86850.1

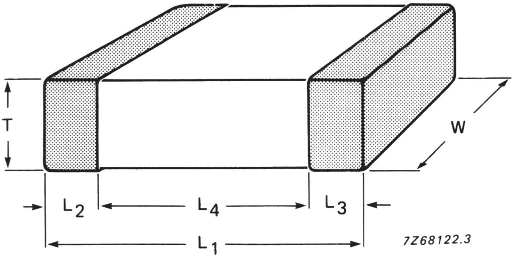
Fig. 3


253 ±1
332 ± 2
45 ± 2
7Z93540.2

Surface mounting ceramic multilayer capacitors

For detailed information see Data Handbook C15

Capacitance range:	
class 1, NPO dielectric	0.47 to 10000 pF (E12–series)*
N220 dielectric	4.7 to 820 pF (E12–series)*
N750 dielectric	6.8 to 1200 pF (E12–series)*
class 2, X7R dielectric	180 pF to 1 µF (E12–series)
Y5V dielectric	2200 to 100000 pF (E6–series)**
Terminations	metalized AgPd (65/35) or NiSn
Rated voltage U_R (d.c.)	50 V (EIA), 63 V (IEC)
Tolerance on capacitance:	
NPO, N220, N750 dielectrics	± 10%, ± 5%; below 10 pF: ± 0.5 pF; below 5.0 pF: ± 0.25 pF¹⁾
X7R dielectric	± 20%, ± 10%
Z5U (Y5V) dielectric	−20 to +80%, ± 20%
Sectional specification	IEC 384–10, 40 (secretariat) 544
Climatic category (IEC 68):	
NPO, N220, N750 dielectrics	55/125/56
X7R dielectric	55/125/56
Y5V dielectric	25/085/56
Resistance to soldering heat	260 °C, 10 s
Packing	bulk: 1000 or 100
	8 mm tape (blister) on reel: 4000 or 10000
	12 mm tape (blister) on reel: 2000 or 5000



Dimensions in mm

size	status	L	W	T		A		C
				min.	max.	min.	max.	min.
0805	P	2.0 ± 0.10	1.25 ± 0.10	0.51***	1.30***	0.25	0.75	0.4
1206	P	3.2 ± 0.15	1.6 ± 0.15	0.51***	1.60***	0.25	0.75	1.4
1210	C	3.4 ± 0.2	2.5 ± 0.2	0.51***	1.90***	0.3	0.75	1.4
1808	C	4.5 ± 0.2	2.0 ± 0.2	0.51	1.90	0.3	0.75	2.2
1812	C	4.5 ± 0.2	3.2 ± 0.2	0.51	1.90	0.3	0.75	2.2
2220	C	5.7 ± 0.2	5.0 ± 0.2	0.51	1.90	0.3	0.75	2.9

* Other values, below 10 pF, on request.

** Values up to 1 µF under development.

*** See also table on next page

1) Smaller tolerances: ±2% for C $\geq$ 10 pF, ±0.25% for C = 5 to 10 pF

Capacitor thickness, 0.47 pF to 560 pF

For detailed information see Data Handbook C15

7Z20464

C (pF)	SIZE 0805					SIZE 1206					SIZE 1210		SIZE 1808		SIZE 1812		SIZE 2220	
	NP0	N220	N750	X7R	Y5V	NP0	N220	N750	X7R	Y5V	NP0	X7R	NP0	X7R	NP0	X7R	NP0	X7R
0.47	▨					▨												
0.56	▨					▨												
0.68	▨					▨												
0.82	▨					▨												
1.0	▨					▨												
1.2	▨					▨												
1.5	▨					▨												
1.8	▨					▨												
2.2	▨					▨												
2.7	▨					▨												
3.3	▨					▨												
3.9	▨					▨												
4.7	▨	▨				▨												
5.6	▨	▨				▨												
6.8	▨	▨	▨			▨		▨										
8.2	▨	▨	▨			▨	▨	▨										
10	▨	▨	▨			▨	▨	▨										
12	▨	▨	▨			▨	▨	▨										
15	▨	▨	▨			▨	▨	▨										
18	▨	▨	▨			▨	▨	▨										
22	▨	▨	▨			▨	▨	▨										
27	▨	▨	▨			▨	▨	▨										
33	▨	▨	▨			▨	▨	▨										
39	▨	▨	▨			▨	▨	▨										
47	▨	▨	▨			▨	▨	▨			░							
56	▨	▨	▨			▨	▨	▨			░							
68	▨	▨	▨			▨	▨	▨			░							
82	▨	▨	▨			▨	▨	▨			░							
100	▨	▨	▨			▨	▨	▨			░		░					
120	▨	▨	▨			▨	▨	▨			░		░					
150	▨	▨	▨			▨	▨	▨			░		░					
180	▨	▨	▨	▨		▨	▨	▨			░		░					
220	▨	▨	▨	▨		▨	▨	▨			░		░					
270	▨	▨	▨	▨		▨	▨	▨			░		░					
330	▨		▨	▨		▨	▨	▨			░		░		░			
390	▩		▨	▨		▨	▨	▨			░		░		░			
470	▩			▨		▨	▨	▨			░		░		░		░	
560	▩			▨		▨	▨	▨			░		░		░		░	

▨	0.51 to 0.70 mm
▩	0.8 to 1.0 mm
░	0.51 to 1.0 mm
■	1.0 to 1.30 mm
▧	1.0 to 1.6 mm

C

PHILIPS

Capacitor thickness, 680 pF to 1 μF

For detailed information see Data Handbook C15

7Z20465

C (pF)	SIZE 0805					SIZE 1206					SIZE 1210		SIZE 1808		SIZE 1812		SIZE 2220	
	NP0	N220	N750	X7R	Y5V	NP0	N220	N750	X7R	Y5V	NP0	X7R	NP0	X7R	NP0	X7R	NP0	X7R
680	■			▨		▨	▨	▨	▨		░		░		░		░	
820	■			▨		▨	▨	▨	▨		░		░		░		░	
1000	■			▨		▨		▨	▨		░		░		░		░	
1200				▨		▩		▨	▨		░		░		░		░	
1500				▨		▩			▨		░		░		░		░	
1800				▨		▩			▨		░		░	░	░		░	
2200				▨	▨	▧			▨		░	░	░	░	░		░	
2700				▨	▨	▧			▨		░	░	░	░	░		░	
3300				▨	▨	▧			▨		░	░	░	░	░		░	
3900				▨	▨				▨		■	░	■	░	░		░	
4700				▨	▨				▨		▧	░	▧	░	░	░	░	
5600				▨	▨				▨			░	▧	░	░	░	░	
6800				▨	▨				▨			░		░		░	░	
8200				▨	▨				▨	▨		░		░		░	░	
10000				▨	▨				▨	▨		░		░		░	░	
12000				▨	▨				▨	▨		░		░		░		░
15000				▨	▨				▨	▨		░		░		░		░
18000				▨	▨				▨	▨		░		░		░		░
22000				▨	▩				▨	▨		░		░		░		░
27000				▩	▩				▨	▨		░		░		░		░
33000				▩	▩				▨	▨		░		░		░		░
39000									▨	▨		░		░		░		░
47000									▨	▨		░		░		░		░
56000									▨	▨		░		░		░		░
68000									▨	▩		░		░		░		░
82000									▩	▩		░		░		░		░
100000									▩	▩		░		░		░		░
120000												░		░		░		░
150000												░		░		░		░
180000												░		░		░		░
220000												░		░		░		░
270000														■		░		░
330000																░		░
390000																░		░
470000																■		░
560000																		░
680000																		░
820000																		░
1000000																		■

▨ 0.51 to 0.70 mm

▩ 0.8 to 1.0 mm

░ 0.51 to 1.0 mm

■ 1.0 to 1.30 mm

▧ 1.0 to 1.6 mm

Class 1 capacitors: NPO, N220, N750 dielectric

For detailed information see Data Handbook C15

C (pF)	DIELECTRIC									
	NPO						N220		N750	
	0805	1206	1210	1808**	1812	2220	0805	1206	0805	1206
0.47	░	░								
0.56	░	░								
0.68	░	░								
0.82	░	░								
1.0	░	░								
1.2	░	░								
1.5	░	░								
1.8	░	░								
2.2	░	░								
2.7	░	░								
3.3	░	░								
3.9	░	░								
4.7	░	░					░			
5.6	░	░					░			
6.8	░	░					░		░	░
8.2	░	░					░	░	░	░
10	░	░					░	░	░	░
12	░	░					░	░	░	░
15	░	░					░	░	░	░
18	░	░					░	░	░	░
22	░	░					░	░	░	░
27	░	░					░	░	░	░
33	░	░					░	░	░	░
39	░	░					░	░	░	░
47	░	░	▨				░	░	░	░
56	░	░	▨				░	░	░	░
68	░	░	▨				░	░	░	░
82	░	░	▨				░	░	░	░
100	░	░	▨	▩			░	░	░	░
120	░	░	▨	▩			░	░	░	░
150	░	░	▨	▩			░	░	░	░
180	░	░	▨	▩			░	░	░	░
220	░	░	▨	▩			░	░	░	░
270	░	░	▨	▩			░	░	░	░
330	░	░	▨	▩	▧			░	░	░
390	░	░	▨	▩	▧			░	░	░
470	░	░	▨	▩	▧	▧		░		░
560	░	░	▨	▩	▧	▧		░		░
680	■	░	▨	▩	▧	▧		░		░
820	■	░	▨	▩	▧	▧		░		░
1000	■	░	▨	▩	▧	▧				░
1200		░	▨	▩	▧	▧				░
1500		░	▨	▩	▧	▧				
1800		░	▨	▩	▧	▧				
2200		■	▨	▩	▧	▧				
2700		■	▨	▩	▧	▧				
3300		■	▨	▩	▧	▧				
3900			▩	▩	▧	▧				
4700			▩	▩	▧	▧				
5600				▩	▧	▧				
6800						▧				
8200						▧				
10000						▧				

░ available in 8 mm tape on reel and in bulk ; usable up to 100 V ; U_R = 63 V

▨ available in 8 mm tape on reel and in bulk ; U_R = 63 V

▧ available in 12 mm tape on reel and in bulk ; U_R = 63 V

■ available in bulk only ; usable up to 100 V ; U_R = 63 V

▩ available in bulk only ; U_R = 63 V

7Z20463

For detailed information see Data Handbook C15

C (pF)	DIELECTRIC X7R					
	0805	1206	1210	1808 *	1812	2220
180	▒					
220	▒					
270	▒					
330	▒					
390	▒					
470	▒					
560	▒					
680	▒	▒				
820	▒	▒				
1000	▒	▒				
1200	▒	▒				
1500	▒	▒				
1800	▒	▒				
2200	▒	▒	▒	▩		
2700	▒	▒	▒	▩		
3300	▒	▒	▒	▩		
3900	▒	▒	▒	▩		
4700	▒	▒	▒	▩	▨	
5600	▒	▒	▒	▩	▨	
6800	▒	▒	▒	▩	▨	
8200	▒	▒	▒	▩	▨	
10000	▒	▒	▒	▩	▨	
12000	▧	▒	▒	▩	▨	▨
15000	▧	▒	▒	▩	▨	▨
18000	▧	▒	▒	▩	▨	▨
22000	▧	▒	▒	▩	▨	▨
27000	▧	▒	▒	▩	▨	▨
33000	▧	▒	▒	▩	▨	▨
39000		▧	▒	▩	▨	▨
47000		▧	▒	▩	▨	▨
56000		▧	▒	▩	▨	▨
68000		▧	▒	▩	▨	▨
82000		▧	▧	▩	▨	▨
100000		▧	▧	■	▨	▨
120000			▧	■	▨	▨
150000			▧	■	▨	▨
180000			▧	■	■	▨
220000			▧	■	■	▨
270000				■	■	▨
330000					■	▨
390000					■	■
470000					■	■
560000						■
680000						■
820000						■
1000000						■

▒ available in 8 mm tape on reel and in bulk ; usable up to 100 V ; U_R = 63 V

▧ available in 8 mm tape on reel and in bulk ; U_R = 63 V

■ available in 12 mm tape on reel and in bulk ; U_R = 63 V

▨ available in 12 mm tape on reel and in bulk ; usable up to 100 V ; U_R = 63 V

■ available in bulk only ; U_R = 63 V

▩ available in bulk only ; usable up to 100 V ; U_R = 63 V

7Z20461

Selection charts

Class 2 capacitors: Y5V dielectric

For detailed information see Data Handbook C15

C (pF)	0805	1206
2200	▨	
3300	▨	
4700	▨	
6800	▨	
10000	▨	▨
15000	▨	▨
22000	▨	▨
33000	▨	▨
47000		▨
47000		▨
100000		▨

▨ available in 8 mm tape on reel,
and in bulk

7Z20462

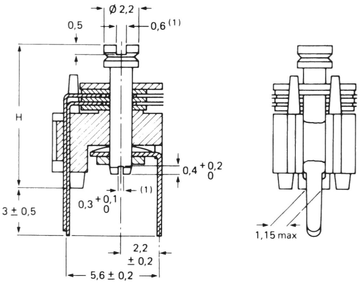
FILM DIELECTRIC TRIMMERS

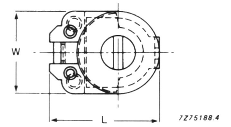
General data

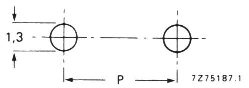
2222 808 2 and 2238 808 2 (5 mm)

For detailed information on these and other types see Data Handbook C7

Capacitance range	5 to 27 pF
Diameter	5 mm
Rated voltage	150 V
Basic specification	IEC 481-1/-4
Climatic category	40/070/21
at norm	IEC 68







(1) Angle between screwdriver slots is arbitrary

Hole pattern; P = 5.6 mm or
P = 5.08 mm

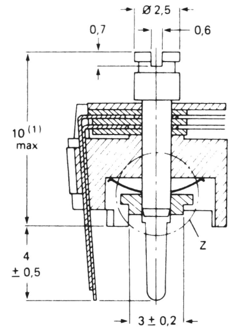
C_{max} pF	C_{min} pF	temperature coefficient 10^{-6}/K	colour code	H_{max} mm	cat. number P = 5.6 mm	cat. number P = 5.08 mm
5	1.5	-200	grey	7	**2222 808 23508**	**2238 808 20508**
10	2	-200	yellow	7	**2222 808 23109**	**2238 808 20109**
15	2.5	-50	blue	8.8	**2222 808 23159**	**2238 808 20159**
20	4	-50	green	8.8	**2222 808 23209**	**2238 808 20209**
27	3	-250	red	9	**2222 808 23279**	**2238 808 20279**

2222 808 1 and 2238 808 1 (7.5 mm)

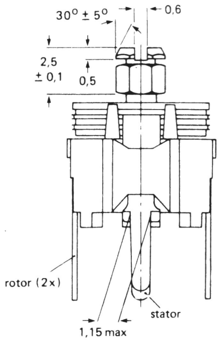
For detailed information on these and other types see Data Handbook C7

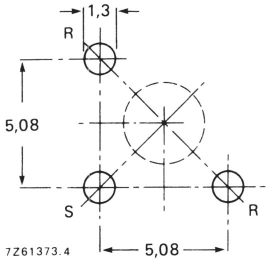
Capacitance range	5.5 to 50 pF
Diameter	7.5 mm
Rated voltage	250 V
Basic specification	IEC 418–1 and 4
Climatic category, IEC 68	40/070/21 and 40/085/21

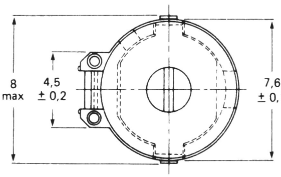
Round head

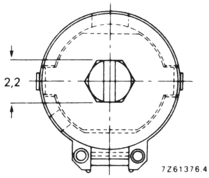

Ø 2,5
0,7
0,6
10 (1) max
4 ± 0,5
Z
3 ± 0,2

Hexagonal head


30° ± 5°
0,6
2,5 ± 0,1
0,5
rotor (2x)
stator
1,15 max


1,3
R
5,08
S
R
5,08
7Z61373.4


8 max
4,5 ± 0,2
7,6 ± 0,1


2,2
7Z61376.4

(1) 11 max. for C_{max} = 40 pF and 50 pF

Hole pattern; R = rotor
S = stator

C_{max} pF	C_{min} pF	temperature coefficient 10^{-6}/K	max. permissible temperature °C	colour code	cat. number
10	1.4	–450	70	yellow	**2222 808 11109**
15	1.6	–200	70	blue	**2222 808 11159**
22	1.8	–250	70	green	**2222 808 11229**
27	1.8	–250	85	red	**2222 808 11279**
33	2	–250	70	brown	**2222 808 11339**
40	2	–100	85	violet	**2222 808 11409**
50	3	–100	85	black	**2222 808 11509**
10	1.2	–400	85	grey	**2222 808 11558**
10	1.4	–450	70	yellow	**2238 808 17109***
22	1.8	–250	70	green	**2238 808 17229***
40	2	–100	85	violet	**2238 808 17409***
50	3	–100	85	black	**2238 808 17509***

* version with hexagonal head

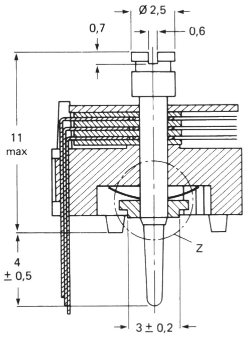
FILM DIELECTRIC TRIMMERS (cont.)

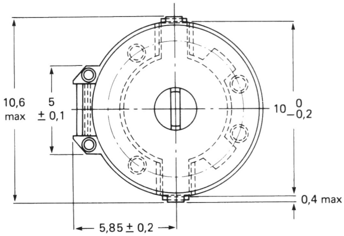
General data
2222 808 3 (10 mm)

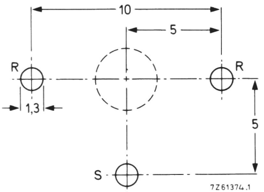
For detailed information on these and other types see Data Handbook C7

Capacitance range	40 to 105 pF
Diameter	10 mm
Rated voltage	250 V
Basic specification	IEC 481–1/–4
Climatic category	40/070/21, 40/085/21
at norm	IEC 68

Round head


Ø 2,5
0,7
0,6
11
max
4
± 0,5
Z
3 ± 0,2


10,6
max
5
± 0,1
10 0 −0,2
0,4 max
5,85 ± 0,2


10
5
R
R
1,3
5
S
7Z61374.1

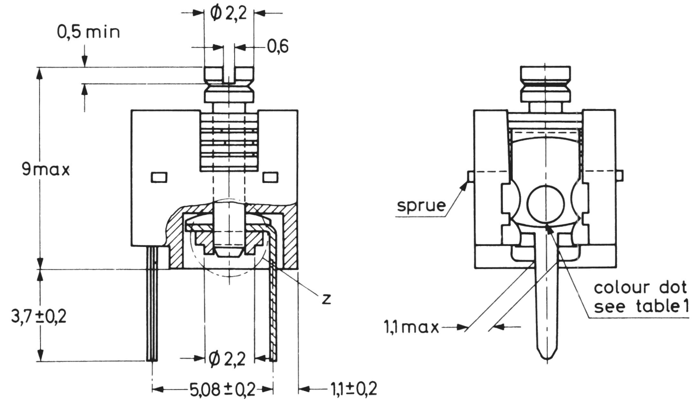
Hole pattern; R = rotor
S = stator

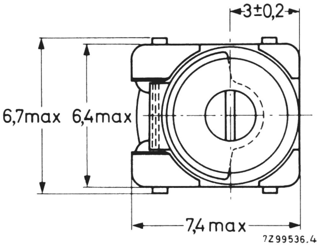
C_{max} pF	C_{min} pF	temperature coefficient 10^{-6}/K	max. permissible temperature °C	colour code	cat. number
40	5.5	−150	70	grey	**2222 808 31409**
65	5.5	−200	70	yellow	**2222 808 31659**
80	6	−100	85	red	**2222 808 31809**
100	7	−100	85	violet	**2222 808 31101**

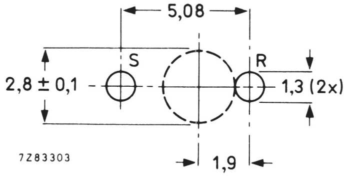
2222 809 050 (125 °C)

For detailed information on these and other types see Data Handbook C7

Capacitance range	3.5 to 18 pF
Rated voltage	300 V
Basic specification	IEC 481-1/-4
Climatic category	40/125/21
at norm	IEC 68


ϕ 2,2
0,5 min
0,6
9max
3,7 ± 0,2
z
ϕ 2,2
5,08 ± 0,2
1,1 ± 0,2
sprue
colour dot see table 1
1,1 max


3 ± 0,2
6,7max
6,4max
7,4 max
7Z99536.4


5,08
S
R
2,8 ± 0,1
1,3 (2x)
7Z83303
1,9

Hole pattern; R = rotor, S = stator

C_{max} pF	C_{min} pF	temperature coefficient 10^{-6}/K	max. tan δ at 1 MHz	colour code	cat. number
3.5	1.2	−250	0.1	orange	**2222 809 05215**
10	1.8	−350	0.1	white	**2222 809 05216**
18	2	−350	0.1	red	**2222 809 05217**
2	0.6	+200	0.1	−	**2222 809 05011***

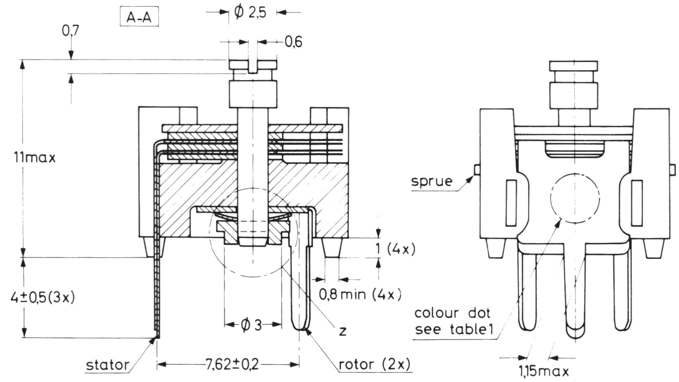
* hex head 1.91 mm

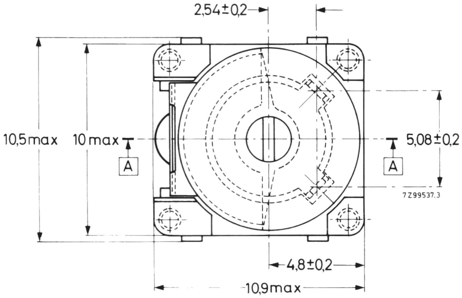
FILM DIELECTRIC TRIMMERS (cont.)

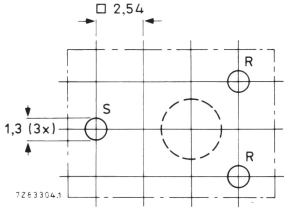
General data
2222 809 080 (125 °C)

For detailed information on these and other types see Data Handbook C7

Capacitance range	40 to 60 pF
Rated voltage	300 V
Basic specification	IEC 481–1/–4
Climatic category at norm	40/125/21 IEC 68


A-A
ø 2,5
0,7
0,6
11max
1 (4x)
0,8 min (4x)
4±0,5(3x)
ø 3
z
stator
7,62±0,2
rotor (2x)
sprue
colour dot
see table1
1,15max


2,54±0,2
10,5max
10 max
A
A
5,08±0,2
7Z99537.3
4,8±0,2
10,9max


□ 2,54
R
S
1,3 (3x)
R
7Z63304.1

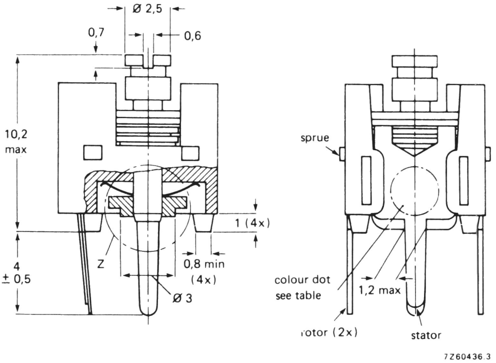
Hole pattern; R = rotor,
S = stator

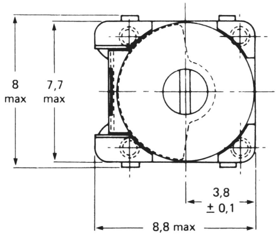
C_{max} pF	C_{min} pF	temperature coefficient 10^{-6}/K	max. tan δ at 1 MHz	colour code	cat. number
40	4	–250	0.1	yellow	**2222 809 08002**
60	5	–250	0.1	blue	**2222 809 08003**

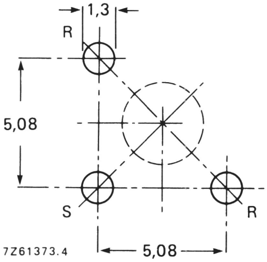
PHILIPS

For detailed information on these and other types see Data Handbook C7

Capacitance range	5.5 to 18 pF
Rated voltage	300 V
Basic specification	IEC 481-1/-4
Climatic category	40/125/21
at norm	IEC 68


Ø 2,5
0,7
0,6
10,2 max
sprue
1 (4x)
4 ± 0,5
Z
0,8 min (4x)
Ø 3
colour dot see table
1,2 max
rotor (2x)
stator
7Z60436.3


8 max
7,7 max
3,8 ± 0,1
8,8 max


1,3
R
5,08
S
R
5,08
7Z61373.4

Hole pattern; R = rotor,
S = stator

C_{max} pF	C_{min} pF	temperature coefficient 10^{-6}/K	colour code	3 solder tags, cat. number
5.5	1.4	-250	green	**2222 809 09001**
9	2	-250	white	**2222 809 09002**
18	2	-250	red	**2222 809 09003**

Fig. 1
3 solder tags

Capacitors, CECC types

Products approved to the CECC (Cenelec Electronic Components Committee) harmonized system for electronic components of assessed quality

Capacitors

type	CECC detail specification
2222 050	CECC 30 301–033
2222 052	CECC 30 301–033
2222 108	CECC 30 301–027
2222 121	CECC 30 302–001
2222 122	CECC 30 302–002
2222 123	CECC 30 302–003
2222 125	CECC 30 302–004
2222 344	CECC 30 401–023
	CECC 30 401–039
2222 370	CECC 30 401–039
2222 371	CECC 30 401–039

Resistors R

Data Handbook System

On most pages, directly underneath the title, reference is made to a 'Data Handbook'. That Handbook is part of the Philips Data Handbook System which is a comprehensive source of information on electronic components, subassemblies and materials. For this catalogue section the following Handbooks are of interest:

book	title
C11	Varistors, thermistors and sensors
C12	Potentiometers, encoders and switches
C13	Fixed resistors

Contents

Data Handbook System R2

Contents R3

Fixed resistors:
Taping specification R4
Carbon film resistors CR25 .... R5
Standard film resistors SFR16T R7
Standard film resistors SFR25 .... R9
Metal film resistors MRS16T R13
Metal film resistors MRS25 .... R16
Metal film precision resistors MPR24 .... R19
High voltage/high ohmic resistors VR25 R20
High voltage/high ohmic resistors VR37 R21
High voltage/high ohmic resistors VR68 R22
Power metal film resistors PR01 .... R23
Power metal film resistors PR02 .... R24
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Taping specification

As an example, details of standard packaging of SFR resistors are given here.
Complete details of packaging of all resistor ranges are given in Data Handbook C13.

Standard packaging:
CR25, SFR16T, SFR25, MRS25, MRS16T, PR01, PR02, PR03, AC03, AC04, AC05, AC07, MPR24, VR25, VR37, VR68.

Resistors having axial leads are supplied on tape. These tapes, or bandoliers, are either reeled or concertinaed in a cardboard box ('ammopack').

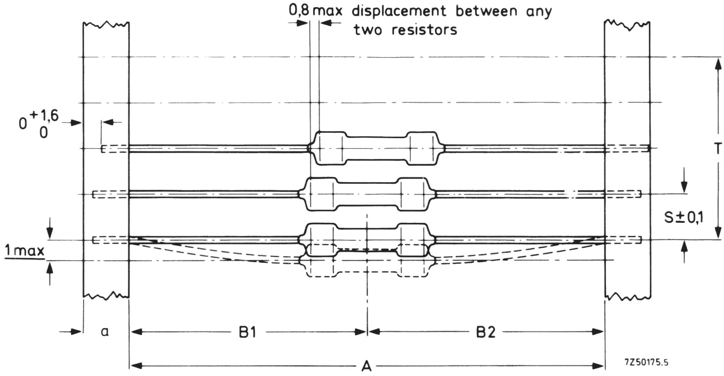

0,8 max displacement between any two resistors
$0^{+1,6}_{0}$
1 max
T
S±0,1
a
B1
B2
A
7Z50175.5

Fig. 1 Tape drawing (dimensions in mm) S = spacing; T = maximum deviation of spacing: 1 mm per 10 spacings or 0,5 mm per 5 spacings.

a = tape width
A = tape distance
B1 – B2 = centricity

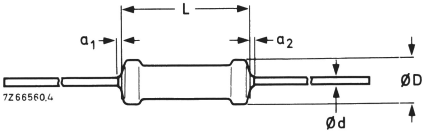
Carbon film resistors: CR25

For detailed information on these and other types see Data Handbook C13
Standard packaging: 5000 pieces, on tape, in box

Resistance range (E24–series)	1 Ω to 1 MΩ
Lower tolerance on resistance	−5%
Upper tolerance on resistance	+5%
Nom. dissipation at T_{amb} = 70 °C	0.33 W
Limiting voltage r.m.s	250 V

D_{max} mm	L_{max} mm	d mm	a ± 0.5 mm	A ± 1.5 mm	$B_1 - B_2$ ± max mm	S mm	T
2.5	6.5	0.6	6	52.5	1.2	5	1 mm per 10 spacings

See page R4 for tape drawing with dimensions



Status = P

R_N Ω	catalogue number	R_N Ω	catalogue number	R_N Ω	catalogue number
1	**2322 211 73108**	6.8	**2322 211 73688**	47	**2322 211 73479**
1.2	**2322 211 73128**	8.2	**2322 211 73828**	56	**2322 211 73569**
1.5	**2322 211 73158**	10	**2322 211 73109**	68	**2322 211 73689**
1.8	**2322 211 73188**	12	**2322 211 73129**	82	**2322 211 73829**
2.2	**2322 211 73228**	15	**2322 211 73159**	100	**2322 211 73101**
2.7	**2322 211 73278**	18	**2322 211 73189**	120	**2322 211 73121**
3.3	**2322 211 73338**	22	**2322 211 73229**	150	**2322 211 73151**
3.9	**2322 211 73398**	27	**2322 211 73279**	180	**2322 211 73181**
4.7	**2322 211 73478**	33	**2322 211 73339**	220	**2322 211 73221**
5.6	**2322 211 73568**	39	**2322 211 73399**	270	**2322 211 73271**

Carbon film resistors: CR25 (cont.)

For detailed information on these and other types see Data Handbook C13
Standard packaging: 5000 pieces, on tape, in box

R_N	catalogue number
330 Ω	**2322 211 73331**
390 Ω	**2322 211 73391**
470 Ω	**2322 211 73471**
560 Ω	**2322 211 73561**
680 Ω	**2322 211 73681**
820 Ω	**2322 211 73821**
1 kΩ	**2322 211 73102**
1.2 kΩ	**2322 211 73122**
1.5 kΩ	**2322 211 73152**
1.8 kΩ	**2322 211 73182**
2.2 kΩ	**2322 211 73222**
2.7 kΩ	**2322 211 73272**
3.3 kΩ	**2322 211 73332**
3.9 kΩ	**2322 211 73392**
4.7 kΩ	**2322 211 73472**
5.6 kΩ	**2322 211 73562**
6.8 kΩ	**2322 211 73682**
8.2 kΩ	**2322 211 73822**
10 kΩ	**2322 211 73103**
12 kΩ	**2322 211 73123**
15 kΩ	**2322 211 73153**
18 kΩ	**2322 211 73183**
22 kΩ	**2322 211 73223**
27 kΩ	**2322 211 73273**
33 kΩ	**2322 211 73333**
39 kΩ	**2322 211 73393**
47 kΩ	**2322 211 73473**
56 kΩ	**2322 211 73563**
68 kΩ	**2322 211 73683**
82 kΩ	**2322 211 73823**
100 kΩ	**2322 211 73104**
120 kΩ	**2322 211 73124**
150 kΩ	**2322 211 73154**
180 kΩ	**2322 211 73184**
220 kΩ	**2322 211 73224**
270 kΩ	**2322 211 73274**
330 kΩ	**2322 211 73334**
390 kΩ	**2322 211 73394**
470 kΩ	**2322 211 73474**
560 kΩ	**2322 211 73564**
680 kΩ	**2322 211 73684**
820 kΩ	**2322 211 73824**
1 MΩ	**2322 211 73105**

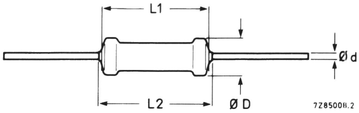
Standard film resistors (metal film): SFR16T

For detailed information on these and other types see Data Handbook C13
Standard packaging: 5000 pieces, on tape, in box

Resistance range (E24–series)	1 Ω to 10 MΩ
Lower tolerance on resistance	−5%
Upper tolerance on resistance	+5%
Temperature coefficient range	±100 to ±250 x 10^{-6}/K
Nominal dissipation at T_{amb} = 70 °C	0.5 W
Maximum noise range	0.1 to 1.5 µV/V
Limiting voltage, r.m.s	200 V

D_{max} mm	$L1_{max}$ mm	$L2_{max}$ mm	d −0.04 mm	a ± 0,5 mm	A ± 1,5 mm	$B_1 - B_2$ ± max mm	S mm	T
1,9	3,7	3,7	0,5	6	52,5	0,5	5	1 mm per 10 spacings

See page R4 for tape drawing with dimensions



Status = P

R_N Ω	catalogue number
1	**2322 180 53108**
1.2	**2322 180 53128**
1.5	**2322 180 53158**
1.8	**2322 180 53188**
2.2	**2322 180 53228**
2.7	**2322 180 53278**
3.3	**2322 180 53338**
3.9	**2322 180 53398**
4.7	**2322 180 53478**
5.6	**2322 180 53568**
6.8	**2322 180 53688**
8.2	**2322 180 53828**
10	**2322 180 53109**
12	**2322 180 53129**
15	**2322 180 53159**
18	**2322 180 53189**
22	**2322 180 53229**
27	**2322 180 53279**
33	**2322 180 53339**
39	**2322 180 53399**
47	**2322 180 53479**
56	**2322 180 53569**
68	**2322 180 53689**

Standard film resistors (metal film) cont.: SFR16T

For detailed information on these and other types see Data Handbook C13
Standard packaging: 5000 pieces, on tape, in box

R_N	catalogue number
82 Ω	**2322 180 53829**
100 Ω	**2322 180 53101**
120 Ω	**2322 180 53121**
150 Ω	**2322 180 53151**
180 Ω	**2322 180 53181**
220 Ω	**2322 180 53221**
270 Ω	**2322 180 53271**
330 Ω	**2322 180 53331**
390 Ω	**2322 180 53391**
470 Ω	**2322 180 53471**
560 Ω	**2322 180 53561**
680 Ω	**2322 180 53681**
820 Ω	**2322 180 53821**
1 kΩ	**2322 180 53102**
1.2 kΩ	**2322 180 53122**
1.5 kΩ	**2322 180 53152**
1.8 kΩ	**2322 180 53182**
2.2 kΩ	**2322 180 53222**
2.7 kΩ	**2322 180 53272**
3.3 kΩ	**2322 180 53332**
3.9 kΩ	**2322 180 53392**
4.7 kΩ	**2322 180 53472**
5.6 kΩ	**2322 180 53562**
6.8 kΩ	**2322 180 53682**
8.2 kΩ	**2322 180 53822**
10 kΩ	**2322 180 53103**
12 kΩ	**2322 180 53123**
15 kΩ	**2322 180 53153**
18 kΩ	**2322 180 53183**
22 kΩ	**2322 180 53223**
27 kΩ	**2322 180 53273**
33 kΩ	**2322 180 53333**
39 kΩ	**2322 180 53393**
47 kΩ	**2322 180 53473**
56 kΩ	**2322 180 53563**
68 kΩ	**2322 180 53683**
82 kΩ	**2322 180 53823**
100 kΩ	**2322 180 53104**
120 kΩ	**2322 180 53124**
150 kΩ	**2322 180 53154**
180 kΩ	**2322 180 53184**
220 kΩ	**2322 180 53224**
270 kΩ	**2322 180 53274**
330 kΩ	**2322 180 53334**
390 kΩ	**2322 180 53394**
470 kΩ	**2322 180 53474**
560 kΩ	**2322 180 53564**
680 kΩ	**2322 180 53684**
820 kΩ	**2322 180 53824**
1 MΩ	**2322 180 53105**
1.2 MΩ	**2322 180 53125**
1.5 MΩ	**2322 180 53155**
1.8 MΩ	**2322 180 53185**
2.2 MΩ	**2322 180 53225**
2.7 MΩ	**2322 180 53275**
3.3 MΩ	**2322 180 53335**
3.9 MΩ	**2322 180 53395**
4.7 MΩ	**2322 180 53475**
5.6 MΩ	**2322 180 53565**
6.8 MΩ	**2322 180 53685**
8.2 MΩ	**2322 180 53825**
10 MΩ	**2322 180 53106**

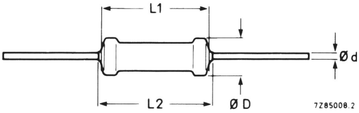
Standard film resistors (metal film) cont.: SFR25

For detailed information on these and other types see Data Handbook C13
Standard packaging: 5000 pieces, on tape, in box

Resistance range	1 Ω to 10 MΩ, tol. ± 5%, E12–series
Temperature coefficient	
R ⩽ 1 MΩ	± 100 x 10^{-6}/K
R > 1 MΩ	± 250 x 10^{-6}/K
Nom. dissipation at T_{amb} = 70 °C	0.4 W
Noise	
R ⩽ 1 MΩ	max. 0.1 μV/V
R > 1 MΩ	max. 1.5 μV/V
Limiting voltage, r.m.s.	250 V

D_{max} mm	$L1_{max}$ mm	$L2_{max}$ mm	d mm	a ± 0.5 mm	A ± 1.5 mm	B_1–B_2 ± max mm	S mm	T
2.5	6.5	7.0	0.6	6	52.5	1.2	5	1 mm per 10 spacings

See page R4 for tape drawing with dimensions



Status = P

R_N Ω	catalogue number	R_N Ω	catalogue number	R_N Ω	catalogue number
1	**2322 181 43108**	6.8	**2322 181 43688**	47	**2322 181 43479**
1.2	**2322 181 43128**	8.2	**2322 181 43828**	56	**2322 181 43569**
1.5	**2322 181 43158**	10	**2322 181 43109**	68	**2322 181 43689**
1.8	**2322 181 43188**	12	**2322 181 43129**	82	**2322 181 43829**
2.2	**2322 181 43228**	15	**2322 181 43159**	100	**2322 181 43101**
2.7	**2322 181 43278**	18	**2322 181 43189**	120	**2322 181 43121**
3.3	**2322 181 43338**	22	**2322 181 43229**	150	**2322 181 43151**
3.9	**2322 181 43398**	27	**2322 181 43279**	180	**2322 181 43181**
4.7	**2322 181 43478**	33	**2322 181 43339**	220	**2322 181 43221**
5.6	**2322 181 43568**	39	**2322 181 43399**		

Standard Film resistors (metal film) cont.: SFR25

For detailed information on these and other types see Data Handbook C13
Standard packaging: 5000 pieces, on tape, in box

R_N	catalogue number
270 Ω	**2322 181 43271**
330 Ω	**2322 181 43331**
390 Ω	**2322 181 43391**
470 Ω	**2322 181 43471**
560 Ω	**2322 181 43561**
680 Ω	**2322 181 43681**
820 Ω	**2322 181 43821**
1 kΩ	**2322 181 43102**
1.2 kΩ	**2322 181 43122**
1.5 kΩ	**2322 181 43152**
1.8 kΩ	**2322 181 43182**
2.2 kΩ	**2322 181 43222**
2.7 kΩ	**2322 181 43272**
3.3 kΩ	**2322 181 43332**
3.9 kΩ	**2322 181 43392**
4.7 kΩ	**2322 181 43472**
5.6 kΩ	**2322 181 43562**
6.8 kΩ	**2322 181 43682**
8.2 kΩ	**2322 181 43822**
10 kΩ	**2322 181 43103**
12 kΩ	**2322 181 43123**
15 kΩ	**2322 181 43153**
18 kΩ	**2322 181 43183**
22 kΩ	**2322 181 43223**
27 kΩ	**2322 181 43273**
33 kΩ	**2322 181 43333**
39 kΩ	**2322 181 43393**
47 kΩ	**2322 181 43473**
56 kΩ	**2322 181 43563**
68 kΩ	**2322 181 43683**
82 kΩ	**2322 181 43823**
100 kΩ	**2322 181 43104**
120 kΩ	**2322 181 43124**
150 kΩ	**2322 181 43154**
180 kΩ	**2322 181 43184**
220 kΩ	**2322 181 43224**
270 kΩ	**2322 181 43274**
330 kΩ	**2322 181 43334**
390 kΩ	**2322 181 43394**
470 kΩ	**2322 181 43474**
560 kΩ	**2322 181 43564**
680 kΩ	**2322 181 43684**
820 kΩ	**2322 181 43824**
1 MΩ	**2322 181 43105**
1.2 MΩ	**2322 181 43125**
1.5 MΩ	**2322 181 43155**
1.8 MΩ	**2322 181 43185**
2.2 MΩ	**2322 181 43225**
2.7 MΩ	**2322 181 43275**
3.3 MΩ	**2322 181 43335**
3.9 MΩ	**2322 181 43395**
4.7 MΩ	**2322 181 43475**
5.6 MΩ	**2322 181 43565**
6.8 MΩ	**2322 181 43685**
8.2 MΩ	**2322 181 43825**
10 MΩ	**2322 181 43106**

Standard Film resistors (metal film) cont.: SFR25

For detailed information on these and other types see Data Handbook C13
Standard packaging: 5000 pieces, on reel

R_N Ω	catalogue number	R_N Ω	catalogue number	R_N Ω	catalogue number
1	**2322 181 63108**	6.8	**2322 181 63688**	47	**2322 181 63479**
1.2	**2322 181 63128**	8.2	**2322 181 63828**	56	**2322 181 63569**
1.5	**2322 181 63158**	10	**2322 181 63109**	68	**2322 181 63689**
1.8	**2322 181 63188**	12	**2322 181 63129**	82	**2322 181 63829**
2.2	**2322 181 63228**	15	**2322 181 63159**	100	**2322 181 63101**
2.7	**2322 181 63278**	18	**2322 181 63189**	120	**2322 181 63121**
3.3	**2322 181 63338**	22	**2322 181 63229**	150	**2322 181 63151**
3.9	**2322 181 63398**	27	**2322 181 63279**	180	**2322 181 63181**
4.7	**2322 181 63478**	33	**2322 181 63339**	220	**2322 181 63221**
5.6	**2322 181 63568**	39	**2322 181 63399**		

Standard Film resistors (metal film) cont.: SFR25

For detailed information on these and other types see Data Handbook C13
Standard packaging: 5000 pieces, on reel

R_N	catalogue number
270 Ω	**2322 181 63271**
330 Ω	**2322 181 63331**
390 Ω	**2322 181 63391**
470 Ω	**2322 181 63471**
560 Ω	**2322 181 63561**
680 Ω	**2322 181 63681**
820 Ω	**2322 181 63821**
1 kΩ	**2322 181 63102**
1.2 kΩ	**2322 181 63122**
1.5 kΩ	**2322 181 63152**
1.8 kΩ	**2322 181 63182**
2.2 kΩ	**2322 181 63222**
2.7 kΩ	**2322 181 63272**
3.3 kΩ	**2322 181 63332**
3.9 kΩ	**2322 181 63392**
4.7 kΩ	**2322 181 63472**
5.6 kΩ	**2322 181 63562**
6.8 kΩ	**2322 181 63682**
8.2 kΩ	**2322 181 63822**
10 kΩ	**2322 181 63103**

R_N	catalogue number
12 kΩ	**2322 181 63123**
15 kΩ	**2322 181 63153**
18 kΩ	**2322 181 63183**
22 kΩ	**2322 181 63223**
27 kΩ	**2322 181 63273**
33 kΩ	**2322 181 63333**
39 kΩ	**2322 181 63393**
47 kΩ	**2322 181 63473**
56 kΩ	**2322 181 63563**
68 kΩ	**2322 181 63683**
82 kΩ	**2322 181 63823**
100 kΩ	**2322 181 63104**
120 kΩ	**2322 181 63124**
150 kΩ	**2322 181 63154**
180 kΩ	**2322 181 63184**
220 kΩ	**2322 181 63224**
270 kΩ	**2322 181 63274**
330 kΩ	**2322 181 63334**
390 kΩ	**2322 181 63394**
470 kΩ	**2322 181 63474**

R_N	catalogue number
560 kΩ	**2322 181 63564**
680 kΩ	**2322 181 63684**
820 kΩ	**2322 181 63824**
1 MΩ	**2322 181 63105**
1.2 MΩ	**2322 181 63125**
1.5 MΩ	**2322 181 63155**
1.8 MΩ	**2322 181 63185**
2.2 MΩ	**2322 181 63225**
2.7 MΩ	**2322 181 63275**
3.3 MΩ	**2322 181 63335**
3.9 MΩ	**2322 181 63395**
4.7 MΩ	**2322 181 63475**
5.6 MΩ	**2322 181 63565**
6.8 MΩ	**2322 181 63685**
8.2 MΩ	**2322 181 63825**
10 MΩ	**2322 181 63106**

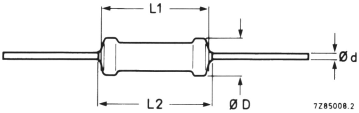
Metal film resistors: MRS16T

For detailed information on these and other types see Data Handbook C13
Standard packaging: 5000 pieces, on tape, in box

Resistance range	10 Ω to 1 MΩ, tol. ± 1%, E24–series
Temperature coefficient	$\pm$ 50 x 10^{-6}/K
Nom. dissipation at T_{amb} = 70 °C	0.4 W
Noise	
R ⩽ 68 kΩ	± 0.1 μV/V
R > 68 kΩ	± 0.5 μV/V
R > 100 kΩ	± 1.5 μV/V
Limiting voltage, r.m.s.	200 V

D_{max} mm	$L1_{max}$ mm	$L2_{max}$ mm	d mm	a ± 0.5 mm	A ± 1.5 mm	$B_1 - B_2$ ± max mm	S mm	T
1.9	3.7	3.7	0.5	6	52.5	0.5	5	1 mm per 10 spacings

See page R4 for tape drawing with dimensions



Status = P

R_N	catalogue number	R_N	catalogue number	R_N	catalogue number
10 Ω	**2322 157 21009**	68 Ω	**2322 157 26809**	470 Ω	**2322 157 24701**
12 Ω	**2322 157 21209**	82 Ω	**2322 157 28209**	560 Ω	**2322 157 25601**
15 Ω	**2322 157 21509**	100 Ω	**2322 157 20001**	680 Ω	**2322 157 26801**
18 Ω	**2322 157 21809**	120 Ω	**2322 157 21201**	820 Ω	**2322 157 28201**
22 Ω	**2322 157 22209**	150 Ω	**2322 157 21501**	1 kΩ	**2322 157 21002**
27 Ω	**2322 157 22709**	180 Ω	**2322 157 21801**	1.2 kΩ	**2322 157 21202**
33 Ω	**2322 157 23309**	220 Ω	**2322 157 22201**	1.5 kΩ	**2322 157 21502**
39 Ω	**2322 157 23909**	270 Ω	**2322 157 22701**	1.8 kΩ	**2322 157 21802**
47 Ω	**2322 157 24709**	330 Ω	**2322 157 23301**	2.2 kΩ	**2322 157 22202**
56 Ω	**2322 157 25609**	390 Ω	**2322 157 23901**	2.7 kΩ	**2322 157 22702**

Metal film resistors: MRS16T (cont.)

For detailed information on these and other types see Data Handbook C13
Standard packaging: 5000 pieces, on tape, in box

R_N	catalogue number
3.3 kΩ	**2322 157 23302**
3.9 kΩ	**2322 157 23902**
4.7 kΩ	**2322 157 24702**
5.6 kΩ	**2322 157 25602**
6.8 kΩ	**2322 157 26802**
8.2 kΩ	**2322 157 28202**
10 kΩ	**2322 157 21003**
12 kΩ	**2322 157 21203**
15 kΩ	**2322 157 21503**
18 kΩ	**2322 157 21803**
22 kΩ	**2322 157 22203**
27 kΩ	**2322 157 22703**
33 kΩ	**2322 157 23303**
39 kΩ	**2322 157 23903**
47 kΩ	**2322 157 24703**
56 kΩ	**2322 157 25603**
68 kΩ	**2322 157 26803**
82 kΩ	**2322 157 28203**
100 kΩ	**2322 157 21004**
120 kΩ	**2322 157 21204**
150 kΩ	**2322 157 21504**
180 kΩ	**2322 157 21804**
220 kΩ	**2322 157 22204**
270 kΩ	**2322 157 22704**
330 kΩ	**2322 157 23304**
390 kΩ	**2322 157 23904**
470 kΩ	**2322 157 24704**
560 kΩ	**2322 157 25604**
680 kΩ	**2322 157 26804**
820 kΩ	**2322 157 28204**
1 MΩ	**2322 157 21005**

Metal film resistors: MRS16T cont.

For detailed information on these and other types see Data Handbook C13
Standard packaging: 5000 pieces, on reel

Status = P

R_N	catalogue number
10 Ω	**2322 157 31009**
12 Ω	**2322 157 31209**
15 Ω	**2322 157 31509**
18 Ω	**2322 157 31809**
22 Ω	**2322 157 32209**
27 Ω	**2322 157 32709**
33 Ω	**2322 157 33309**
39 Ω	**2322 157 33909**
47 Ω	**2322 157 34709**
56 Ω	**2322 157 35609**
68 Ω	**2322 157 36809**
82 Ω	**2322 157 38209**
100 Ω	**2322 157 30001**
120 Ω	**2322 157 31201**
150 Ω	**2322 157 31501**
180 Ω	**2322 157 31801**
220 Ω	**2322 157 32201**
270 Ω	**2322 157 32701**
330 Ω	**2322 157 33301**
390 Ω	**2322 157 33901**
470 Ω	**2322 157 34701**
560 Ω	**2322 157 35601**
680 Ω	**2322 157 36801**
820 Ω	**2322 157 38201**
1 kΩ	**2322 157 31002**
1.2 kΩ	**2322 157 31202**
1.5 kΩ	**2322 157 31502**
1.8 kΩ	**2322 157 31802**
2.2 kΩ	**2322 157 32202**
2.7 kΩ	**2322 157 32702**
3.3 kΩ	**2322 157 33302**
3.9 kΩ	**2322 157 33902**
4.7 kΩ	**2322 157 34702**
5.6 kΩ	**2322 157 35602**
6.8 kΩ	**2322 157 36802**
8.2 kΩ	**2322 157 38202**
10 kΩ	**2322 157 31003**
12 kΩ	**2322 157 31203**
15 kΩ	**2322 157 31503**
18 kΩ	**2322 157 31803**
22 kΩ	**2322 157 32203**
27 kΩ	**2322 157 32703**
33 kΩ	**2322 157 33303**
39 kΩ	**2322 157 33903**
47 kΩ	**2322 157 34703**
56 kΩ	**2322 157 35603**
68 kΩ	**2322 157 36803**
82 kΩ	**2322 157 38203**
100 kΩ	**2322 157 31004**
120 kΩ	**2322 157 31204**
150 kΩ	**2322 157 31504**
180 kΩ	**2322 157 31804**
220 kΩ	**2322 157 32204**
270 kΩ	**2322 157 32704**
330 kΩ	**2322 157 33304**
390 kΩ	**2322 157 33904**
470 kΩ	**2322 157 34704**
560 kΩ	**2322 157 35604**
680 kΩ	**2322 157 36804**
820 kΩ	**2322 157 38204**
1 MΩ	**2322 157 31005**

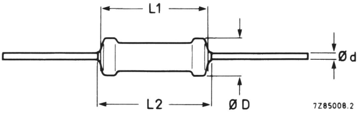
Metal film resistors: MRS25

For detailed information on these and other types see Data Handbook C13
Standard packaging: 5000 pieces, on tape, in box

Resistance range	1 Ω to 10 MΩ, tol. ± 1%, E48–series
Temperature coefficient	
$R < 4{,}99\ \Omega$	± 100 x 10^{-6}/K
$R \geqslant 4{,}99\ \Omega$	± 50 x 10^{-6}/K
Nom. dissipation at $T_{amb} = 70$ °C	0.6 W
Noise	max. 0.1 µV/V
Limiting voltage, r.m.s.	350 V

D_{max} mm	$L1_{max}$ mm	$L2_{max}$ mm	d mm	a ± 0.5 mm	A ± 1.5 mm	$B_1 - B_2$ ± max mm	S mm	T
2.5	6.5	7.0	0.6	6	52.5	1.2	5	1 mm per 10 spacings

See page R4 for tape drawing with dimensions



Status = P

R_N ohm	Catalogue number
1	**2322 156 21008**
1.1	**2322 156 21108**
1.2	**2322 156 21208**
1.3	**2322 156 21308**
1.5	**2322 156 21508**
1.6	**2322 156 21608**
1.8	**2322 156 21808**
2	**2322 156 22008**
2.2	**2322 156 22208**
2.4	**2322 156 22408**
2.7	**2322 156 22708**
3	**2322 156 23008**
3.3	**2322 156 23308**
3.6	**2322 156 23608**
3.9	**2322 156 23908**
4.3	**2322 156 24308**
4.7	**2322 156 24708**
5.1	**2322 156 25108**
5.6	**2322 156 25608**
6.2	**2322 156 26208**
6.8	**2322 156 26808**
7.5	**2322 156 27508**
8.2	**2322 156 28208**
9.1	**2322 156 29108**
10	**2322 156 21009**
11	**2322 156 21109**
12	**2322 156 21209**
13	**2322 156 21309**
15	**2322 156 21509**
16	**2322 156 21609**

Metal film resistors (cont.): MRS25

For detailed information on these and other types see Data Handbook C13
Standard packaging: 5000 pieces, on tape, in box

R_N	catalogue number	R_N	catalogue number	R_N	catalogue number
18 Ω	**2322 156 21809**	1.3 kΩ	**2322 156 21302**	100 kΩ	**2322 156 21004**
20 Ω	**2322 156 22009**	1.5 kΩ	**2322 156 21502**	110 kΩ	**2322 156 21104**
22 Ω	**2322 156 22209**	1.6 kΩ	**2322 156 21602**	120 kΩ	**2322 156 21204**
24 Ω	**2322 156 22409**	1.8 kΩ	**2322 156 21802**	130 kΩ	**2322 156 21304**
27 Ω	**2322 156 22709**	2 kΩ	**2322 156 22002**	150 kΩ	**2322 156 21504**
30 Ω	**2322 156 23009**	2.2 kΩ	**2322 156 22202**	160 kΩ	**2322 156 21604**
33 Ω	**2322 156 23309**	2.4 kΩ	**2322 156 22402**	180 kΩ	**2322 156 21804**
36 Ω	**2322 156 23609**	2.7 kΩ	**2322 156 22702**	200 kΩ	**2322 156 22004**
39 Ω	**2322 156 23909**	3 kΩ	**2322 156 23002**	220 kΩ	**2322 156 22204**
43 Ω	**2322 156 24309**	3.3 kΩ	**2322 156 23302**	240 kΩ	**2322 156 22404**
47 Ω	**2322 156 24709**	3.6 kΩ	**2322 156 23602**	270 kΩ	**2322 156 22704**
51 Ω	**2322 156 25109**	3.9 kΩ	**2322 156 23902**	300 kΩ	**2322 156 23004**
56 Ω	**2322 156 25609**	4.3 kΩ	**2322 156 24302**	330 kΩ	**2322 156 23304**
62 Ω	**2322 156 26209**	4.7 kΩ	**2322 156 24702**	360 kΩ	**2322 156 23604**
68 Ω	**2322 156 26809**	5.1 kΩ	**2322 156 25102**	390 kΩ	**2322 156 23904**
75 Ω	**2322 156 27509**	5.6 kΩ	**2322 156 25602**	430 kΩ	**2322 156 24304**
82 Ω	**2322 156 28209**	6.2 kΩ	**2322 156 26202**	470 kΩ	**2322 156 24704**
91 Ω	**2322 156 29109**	6.8 kΩ	**2322 156 26802**	510 kΩ	**2322 156 25104**
100 Ω	**2322 156 21001**	7.5 kΩ	**2322 156 27502**	560 kΩ	**2322 156 25604**
110 Ω	**2322 156 21101**	8.2 kΩ	**2322 156 28202**	620 kΩ	**2322 156 26204**
120 Ω	**2322 156 21201**	9.1 kΩ	**2322 156 29102**	680 kΩ	**2322 156 26804**
130 Ω	**2322 156 21301**	10 kΩ	**2322 156 21003**	750 kΩ	**2322 156 27504**
150 Ω	**2322 156 21501**	11 kΩ	**2322 156 21103**	820 kΩ	**2322 156 28204**
160 Ω	**2322 156 21601**	12 kΩ	**2322 156 21203**	910 kΩ	**2322 156 29104**
180 Ω	**2322 156 21801**	13 kΩ	**2322 156 21303**	1 MΩ	**2322 156 21005**
200 Ω	**2322 156 22001**	15 kΩ	**2322 156 21503**	1.1 MΩ	**2322 156 21105**
220 Ω	**2322 156 22201**	16 kΩ	**2322 156 21603**	1.2 MΩ	**2322 156 21205**
240 Ω	**2322 156 22401**	18 kΩ	**2322 156 21803**	1.3 MΩ	**2322 156 21305**
270 Ω	**2322 156 22701**	20 kΩ	**2322 156 22003**	1.5 MΩ	**2322 156 21505**
300 Ω	**2322 156 23001**	22 kΩ	**2322 156 22203**	1.6 MΩ	**2322 156 21605**
330 Ω	**2322 156 23301**	24 kΩ	**2322 156 22403**	1.8 MΩ	**2322 156 21805**
360 Ω	**2322 156 23601**	27 kΩ	**2322 156 22703**	2 MΩ	**2322 156 22005**
390 Ω	**2322 156 23901**	30 kΩ	**2322 156 23003**	2.2 MΩ	**2322 156 22205**
430 Ω	**2322 156 24301**	33 kΩ	**2322 156 23303**	2. MΩ	**2322 156 22405**
470 Ω	**2322 156 24701**	36 kΩ	**2322 156 23603**	2.7 MΩ	**2322 156 22705**
510 Ω	**2322 156 25101**	39 kΩ	**2322 156 23903**	3 MΩ	**2322 156 23005**
560 Ω	**2322 156 25601**	43 kΩ	**2322 156 24303**	3.01 MΩ	**2322 156 23015**
620 Ω	**2322 156 26201**	47 kΩ	**2322 156 24703**	3.3 MΩ	**2322 156 23305**
680 Ω	**2322 156 26801**	51 kΩ	**2322 156 25103**	3.6 MΩ	**2322 156 23605**
750 Ω	**2322 156 27501**	56 kΩ	**2322 156 25603**	3.65 MΩ	**2322 156 23655**
820 Ω	**2322 156 28201**	62 kΩ	**2322 156 26203**	3.9 MΩ	**2322 156 23905**
910 Ω	**2322 156 29101**	68 kΩ	**2322 156 26803**	3.92 MΩ	**2322 156 23925**
1 kΩ	**2322 156 21002**	75 kΩ	**2322 156 27503**	4.3 MΩ	**2322 156 24305**
1.1 kΩ	**2322 156 21102**	82 kΩ	**2322 156 28203**	4.7 MΩ	**2322 156 24705**
1.2 kΩ	**2322 156 21202**	91 kΩ	**2322 156 29103**	4.75 MΩ	**2322 156 24755**

Metal film resistors (cont.): MRS25

For detailed information on these and other types see Data Handbook C13
Standard packaging: 5000 pieces, on tape, in box

R_N MΩ	catalogue number
5.1	**2322 156 25105**
5.6	**2322 156 25605**
6.2	**2322 156 26205**
6.8	**2322 156 26805**
7.5	**2322 156 27505**
8.2	**2322 156 28205**
9.1	**2322 156 29105**
10	**2322 156 21006**

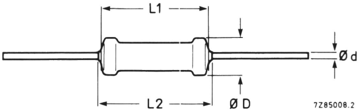
Metal film precision resistors: MPR24

For detailed information on these and other types see Data Handbook C13
Standard packaging: 100 pieces, on tape, in box

Resistance range (E12–series)	5.6 Ω to 1 MΩ
Lower tolerance on resistance	−0.1%
Upper tolerance on resistance	+0.1%
Temperature coefficient between 20 and 70 °C	±25 x 10^{-6}/K
Climatic category	55/155/56
Nom. dissipation at T_{amb} = 70 °C	0.25 W
Basic specification	IEC115–5

D_{max} mm	$L1_{max}$ mm	$L2_{max}$ mm	d mm	a ± 0,5 mm	A ± 1,5 mm	$B_1 - B_2$ ± max mm	S mm	T
2.5	6.5	7.5	0.6	6	63.5	1.2	5	1 mm per 10 spacings

See page R4 for tape drawing with dimensions



Status = P

R_N	catalogue number
5.6 Ω	**2322 141 48022**
6.8 Ω	**2322 141 48024**
8.2 Ω	**2322 141 48025**
10 Ω	**2322 141 40048**
12 Ω	**2322 141 40599**
15 Ω	**2322 141 40123**
18 Ω	**2322 141 48028**
22 Ω	**2322 141 48029**
27 Ω	**2322 141 48031**
33 Ω	**2322 141 48032**
39 Ω	**2322 141 48034**
47 Ω	**2322 141 40968**
56 Ω	**2322 141 48037**
68 Ω	**2322 141 40906**
82 Ω	**2322 141 48039**
100 Ω	**2322 141 40049**
120 Ω	**2322 141 40617**
150 Ω	**2322 141 40227**
180 Ω	**2322 141 40619**
220 Ω	**2322 141 40621**
270 Ω	**2322 141 40784**
330 Ω	**2322 141 40623**
390 Ω	**2322 141 40624**
470 Ω	**2322 141 40625**
560 Ω	**2322 141 40626**
680 Ω	**2322 141 40627**
820 Ω	**2322 141 40628**
1 kΩ	**2322 141 40037**
1.2 kΩ	**2322 141 40015**
1.5 kΩ	**2322 141 40326**
1.8 kΩ	**2322 141 40629**
2.2 kΩ	**2322 141 40631**
2.7 kΩ	**2322 141 40632**
3.3 kΩ	**2322 141 40633**
3.9 kΩ	**2322 141 40634**
4.7 kΩ	**2322 141 40045**
5.6 kΩ	**2322 141 40635**
6.8 kΩ	**2322 141 40636**
8.2 kΩ	**2322 141 40637**
10 kΩ	**2322 141 40008**
12 kΩ	**2322 141 40061**
15 kΩ	**2322 141 40422**
18 kΩ	**2322 141 40024**
22 kΩ	**2322 141 40638**
27 kΩ	**2322 141 40639**
33 kΩ	**2322 141 40641**
39 kΩ	**2322 141 40642**
47 kΩ	**2322 141 40643**
56 kΩ	**2322 141 40644**
68 kΩ	**2322 141 40645**
82 kΩ	**2322 141 40646**
100 kΩ	**2322 141 40067**
120 kΩ	**2322 141 40672**
150 kΩ	**2322 141 40516**
180 kΩ	**2322 141 40951**
220 kΩ	**2322 141 40652**
270 kΩ	**2322 141 40788**
330 kΩ	**2322 141 48051**
390 kΩ	**2322 141 48052**
470 kΩ	**2322 141 40954**
560 kΩ	**2322 141 48055**
680 kΩ	**2322 141 48056**
820 kΩ	**2322 141 40978**
1 MΩ	**2322 141 40052**

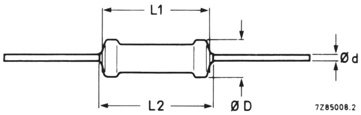
High voltage/high ohmic resistors: VR25

For detailed information on these and other types see Data Handbook C13
Standard packaging: 1000 pieces, on tape, in box

Resistance range	100 kΩ to 6.8 MΩ, tol. ± 5%, E6–series
Temperature coefficient	± 200 x 10^{-6}/K
Max. dissipation at T_{amb} = 70 °C	0.25 W
Noise	max. 0.5 µV/V
Limiting voltage, r.m.s.	1600 V (d.c.) or 1150 V (r.m.s.)

D_{max} mm	$L1_{max}$ mm	$L2_{max}$ mm	d mm	a ± 0.5 mm	A ± 1.5 mm	$B_1 - B_2$ ± max mm	S mm	T
2.5	6.5	7.5	0.6	6	52.5	1.2	5	1 mm per 10 spacings

See page R4 for tape drawing with dimensions



Status = P

R_N	catalogue number
100 kΩ	**2322 241 13104**
150 kΩ	**2322 241 13154**
220 kΩ	**2322 241 13224**
330 kΩ	**2322 241 13334**
470 kΩ	**2322 241 13474**
680 kΩ	**2322 241 13684**
1 MΩ	**2322 241 13105**
1.5 MΩ	**2322 241 13155**
2.2 MΩ	**2322 241 13225**
3.3 MΩ	**2322 241 13335**
4.7 MΩ	**2322 241 13475**
6.8 MΩ	**2322 241 13685**

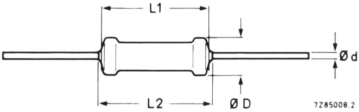
High voltage/high ohmic resistors (cont.): VR37

For detailed information on these and other types see Data Handbook C13
Standard packaging: 1000 pieces, on tape, in box

Resistance range (E6–series)	100 kΩ to 33 MΩ
Lower tolerance on resistance	−5%
Upper tolerance on resistance	+5%
Temperature coefficient	±200 x 10^{-6}/K
Max. dissipation at T_{amb} = 70 °C	<0.5 W
Noise	<2.5 µV/V
Limiting voltage, r.m.s	2500 V

D_{max} mm	$L1_{max}$ mm	$L2_{max}$ mm	d mm	a ± 0.5 mm	A ± 1.5 mm	$B_1 - B_2$ ± max mm	S mm	T
3.7	9.0	10	0.7	6	52.4	1.2	5	1 mm per 10 spacings

See page R4 for tape drawing with dimensions



Status = P

R_N	catalogue number
100 kΩ	**2322 242 13104**
150 kΩ	**2322 242 13154**
220 kΩ	**2322 242 13224**
330 kΩ	**2322 242 13334**
470 kΩ	**2322 242 13474**
680 kΩ	**2322 242 13684**
1 MΩ	**2322 242 13105**
1.5 MΩ	**2322 242 13155**
2.2 MΩ	**2322 242 13225**
3.3 MΩ	**2322 242 13335**
4.7 MΩ	**2322 242 13475**
6.8 MΩ	**2322 242 13685**
10 MΩ	**2322 242 13106**
15 MΩ	**2322 242 13156**
22 MΩ	**2322 242 13226**
33 MΩ	**2322 242 13336**

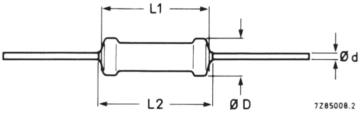
High voltage/high ohmic resistors (cont.): VR68

For detailed information on these and other types see Data Handbook C13
Standard packaging: 500 pieces, on tape, in box

Resistance range (E6–series)	100 kΩ to 68 MΩ
Lower tolerance on resistance	−5%
Upper tolerance on resistance	+5%
Temperature coefficient	±200 x 10^{-6}/K
Max. dissipation at T_{amb} = 70 °C	<1 W
Noise	<2.5 μV/V
Limiting voltage, r.m.s	7000 V

D_{max} mm	$L1_{max}$ mm	$L2_{max}$ mm	d mm	a ± 0.5 mm	A ± 1.5 mm	$B_1 - B_2$ ± max mm	S mm	T
6.8	16.5	19	0.8	5	66.7	1.2	10	1 mm per 10 spacings

See page R4 for tape drawing with dimensions



Status = P

R_N	catalogue number
100 kΩ	**2322 244 13104**
150 kΩ	**2322 244 13154**
220 kΩ	**2322 244 13224**
330 kΩ	**2322 244 13334**
470 kΩ	**2322 244 13474**
680 kΩ	**2322 244 13684**
1 MΩ	**2322 244 13105**
1.5 MΩ	**2322 244 13155**
2.2 MΩ	**2322 244 13225**
3.3 MΩ	**2322 244 13335**
4.7 MΩ	**2322 244 13475**
6.8 MΩ	**2322 244 13685**
10 MΩ	**2322 244 13106**
15 MΩ	**2322 244 13156**
22 MΩ	**2322 244 13226**
33 MΩ	**2322 244 13336**
47 MΩ	**2322 244 13476**
68 MΩ	**2322 244 13686**

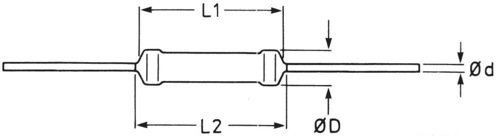
Power metal film resistors: PR01

For detailed information on these and other types see Data Handbook C13
Standard packaging: 1000 pieces, on tape, in box

Resistance range (E12–series)	1 Ω to 1 MΩ
Lower tolerance on resistance	−5%
Upper tolerance on resistance	+5%
Max. body temperature (hot spot)	205 °C
Nom. dissipation at T_{amb} = 70 °C	1 W
Limiting voltage, r.m.s	350 V

D_{max} mm	$L1_{max}$ mm	$L2_{max}$ mm	d mm	a ± 0.5 mm	A ± 1.5 mm	$B_1 - B_2$ ± max mm	S mm	T
2.5	6.5	8	0.6	6	73.5	1.2	5	1 mm per 10 spacings

See page R4 for tape drawing with dimensions



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Status = P

R_N	catalogue number
1 Ω	**2322 193 13108**
1.2 Ω	**2322 193 13128**
1.5 Ω	**2322 193 13158**
1.8 Ω	**2322 193 13188**
2.2 Ω	**2322 193 13228**
2.7 Ω	**2322 193 13278**
3.3 Ω	**2322 193 13338**
3.9 Ω	**2322 193 13398**
4.7 Ω	**2322 193 13478**
5.6 Ω	**2322 193 13568**
6.8 Ω	**2322 193 13688**
8.2 Ω	**2322 193 13828**
10 Ω	**2322 193 13109**
12 Ω	**2322 193 13129**
15 Ω	**2322 193 13159**
18 Ω	**2322 193 13189**
22 Ω	**2322 193 13229**
27 Ω	**2322 193 13279**
33 Ω	**2322 193 13339**
39 Ω	**2322 193 13399**
47 Ω	**2322 193 13479**
56 Ω	**2322 193 13569**
68 Ω	**2322 193 13689**
82 Ω	**2322 193 13829**
100 Ω	**2322 193 13101**
120 Ω	**2322 193 13121**
150 Ω	**2322 193 13151**
180 Ω	**2322 193 13181**
220 Ω	**2322 193 13221**
270 Ω	**2322 193 13271**
330 Ω	**2322 193 13331**
390 Ω	**2322 193 13391**
470 Ω	**2322 193 13471**
560 Ω	**2322 193 13561**
680 Ω	**2322 193 13681**
820 Ω	**2322 193 13821**
1 kΩ	**2322 193 13102**
1.2 kΩ	**2322 193 13122**
1.5 kΩ	**2322 193 13152**
1.8 kΩ	**2322 193 13182**
2.2 kΩ	**2322 193 13222**
2.7 kΩ	**2322 193 13272**
3.3 kΩ	**2322 193 13332**
3.9 kΩ	**2322 193 13392**
4.7 kΩ	**2322 193 13472**
5.6 kΩ	**2322 193 13562**
6.8 kΩ	**2322 193 13682**
8.2 kΩ	**2322 193 13822**
10 kΩ	**2322 193 13103**
12 kΩ	**2322 193 13123**
15 kΩ	**2322 193 13153**
18 kΩ	**2322 193 13183**
22 kΩ	**2322 193 13223**
27 kΩ	**2322 193 13273**
33 kΩ	**2322 193 13333**
39 kΩ	**2322 193 13393**
47 kΩ	**2322 193 13473**
56 kΩ	**2322 193 13563**
68 kΩ	**2322 193 13683**
82 kΩ	**2322 193 13823**
100 kΩ	**2322 193 13104**
120 kΩ	**2322 193 13124**
150 kΩ	**2322 193 13154**
180 kΩ	**2322 193 13184**
220 kΩ	**2322 193 13224**
270 kΩ	**2322 193 13274**
330 kΩ	**2322 193 13334**
390 kΩ	**2322 193 13394**
470 kΩ	**2322 193 13474**
560 kΩ	**2322 193 13564**
680 kΩ	**2322 193 13684**
820 kΩ	**2322 193 13824**
1 MΩ	**2322 193 13105**

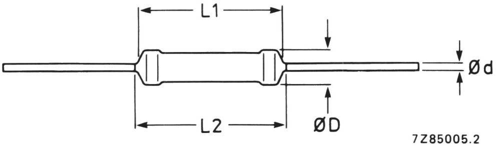
Power metal film resistors: PR02

For detailed information on these and other types see Data Handbook C13
Standard packaging: 1000 pieces, on tape, in box

Resistance range (E12–series)	1 Ω to 1 MΩ
Lower tolerance on resistance	−5%
Upper tolerance on resistance	+5%
Max. body temperature (hot spot)	220 °C
Nom. dissipation at T_{amb} = 70 °C	2 W
Limiting voltage, r.m.s	500 V

D_{max} mm	$L1_{max}$ mm	$L2_{max}$ mm	d mm	a ± 0.5 mm	A ± 1.5 mm	$B_1 - B_2$ ± max mm	S mm	T
3.9	10	11	0.8	6	73	1.2	5	1 mm per 10 spacings

See page R4 for tape drawing with dimensions



Status = P

R_N	catalogue number
1 Ω	**2322 194 13108**
1.2 Ω	**2322 194 13128**
1.5 Ω	**2322 194 13158**
1.8 Ω	**2322 194 13188**
2.2 Ω	**2322 194 13228**
2.7 Ω	**2322 194 13278**
3.3 Ω	**2322 194 13338**
3.9 Ω	**2322 194 13398**
4.7 Ω	**2322 194 13478**
5.6 Ω	**2322 194 13568**
6.8 Ω	**2322 194 13688**
8.2 Ω	**2322 194 13828**
10 Ω	**2322 194 13109**
12 Ω	**2322 194 13129**
15 Ω	**2322 194 13159**
18 Ω	**2322 194 13189**
22 Ω	**2322 194 13229**
27 Ω	**2322 194 13279**
33 Ω	**2322 194 13339**
39 Ω	**2322 194 13399**
47 Ω	**2322 194 13479**
56 Ω	**2322 194 13569**
68 Ω	**2322 194 13689**
82 Ω	**2322 194 13829**
100 Ω	**2322 194 13101**
120 Ω	**2322 194 13121**
150 Ω	**2322 194 13151**
180 Ω	**2322 194 13181**
220 Ω	**2322 194 13221**
270 Ω	**2322 194 13271**
330 Ω	**2322 194 13331**
390 Ω	**2322 194 13391**
470 Ω	**2322 194 13471**
560 Ω	**2322 194 13561**
680 Ω	**2322 194 13681**
820 Ω	**2322 194 13821**
1 kΩ	**2322 194 13102**
1.2 kΩ	**2322 194 13122**
1.5 kΩ	**2322 194 13152**
1.8 kΩ	**2322 194 13182**
2.2 kΩ	**2322 194 13222**
2.7 kΩ	**2322 194 13272**
3.3 kΩ	**2322 194 13332**
3.9 kΩ	**2322 194 13392**
4.7 kΩ	**2322 194 13472**
5.6 kΩ	**2322 194 13562**
6.8 kΩ	**2322 194 13682**
8.2 kΩ	**2322 194 13822**
10 kΩ	**2322 194 13103**
12 kΩ	**2322 194 13123**
15 kΩ	**2322 194 13153**
18 kΩ	**2322 194 13183**
22 kΩ	**2322 194 13223**
27 kΩ	**2322 194 13273**
33 kΩ	**2322 194 13333**
39 kΩ	**2322 194 13393**
47 kΩ	**2322 194 13473**
56 kΩ	**2322 194 13563**
68 kΩ	**2322 194 13683**
82 kΩ	**2322 194 13823**
100 kΩ	**2322 194 13104**
120 kΩ	**2322 194 13124**
150 kΩ	**2322 194 13154**
180 kΩ	**2322 194 13184**
220 kΩ	**2322 194 13224**
270 kΩ	**2322 194 13274**
330 kΩ	**2322 194 13334**
390 kΩ	**2322 194 13394**
470 kΩ	**2322 194 13474**
560 kΩ	**2322 194 13564**
680 kΩ	**2322 194 13684**
820 kΩ	**2322 194 13824**
1 MΩ	**2322 194 13105**

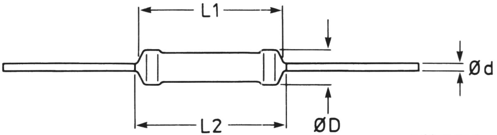
Power metal film resistors: PR03

For detailed information on these and other types see Data Handbook C13
Standard packaging: 500 pieces, on tape, in box

Resistance range (E12–series)	1 Ω to 1 MΩ
Lower tolerance on resistance	−5%
Lower tolerance on resistance	+5%
Max. body temperature (hot spot)	250 °C
Nom. dissipation at T_{amb} = 70 °C	3 W
Limiting voltage, r.m.s	750 V

D_{max} mm	$L1_{max}$ mm	$L2_{max}$ mm	d mm	a ± 0.5 mm	A ± 1.5 mm	$B_1 - B_2$ ± max mm	S mm	T
5.2	16.7	17.9	0.8	6	80	1.2	10	1 mm per 10 spacings

See page R4 for tape drawing with dimensions



7Z85005.2

Status = P

R_N	catalogue number
1 Ω	**2322 195 13108**
1.2 Ω	**2322 195 13128**
1.5 Ω	**2322 195 13158**
1.8 Ω	**2322 195 13188**
2.2 Ω	**2322 195 13228**
2.7 Ω	**2322 195 13278**
3.3 Ω	**2322 195 13338**
3.9 Ω	**2322 195 13398**
4.7 Ω	**2322 195 13478**
5.6 Ω	**2322 195 13568**
6.8 Ω	**2322 195 13688**
8.2 Ω	**2322 195 13828**
10 Ω	**2322 195 13109**
12 Ω	**2322 195 13129**
15 Ω	**2322 195 13159**
18 Ω	**2322 195 13189**
22 Ω	**2322 195 13229**
27 Ω	**2322 195 13279**
33 Ω	**2322 195 13339**
39 Ω	**2322 195 13399**
47 Ω	**2322 195 13479**
56 Ω	**2322 195 13569**
68 Ω	**2322 195 13689**
82 Ω	**2322 195 13829**
100 Ω	**2322 195 13101**
120 Ω	**2322 195 13121**
150 Ω	**2322 195 13151**
180 Ω	**2322 195 13181**
220 Ω	**2322 195 13221**
270 Ω	**2322 195 13271**
330 Ω	**2322 195 13331**
390 Ω	**2322 195 13391**
470 Ω	**2322 195 13471**
560 Ω	**2322 195 13561**
680 Ω	**2322 195 13681**
820 Ω	**2322 195 13821**
1 kΩ	**2322 195 13102**
1.2 kΩ	**2322 195 13122**
1.5 kΩ	**2322 195 13152**
1.8 kΩ	**2322 195 13182**
2.2 kΩ	**2322 195 13222**
2.7 kΩ	**2322 195 13272**
3.3 kΩ	**2322 195 13332**
3.9 kΩ	**2322 195 13392**
4.7 kΩ	**2322 195 13472**
5.6 kΩ	**2322 195 13562**
6.8 kΩ	**2322 195 13682**
8.2 kΩ	**2322 195 13822**
10 kΩ	**2322 195 13103**
12 kΩ	**2322 195 13123**
15 kΩ	**2322 195 13153**
18 kΩ	**2322 195 13183**
22 kΩ	**2322 195 13223**
27 kΩ	**2322 195 13273**
33 kΩ	**2322 195 13333**
39 kΩ	**2322 195 13393**
47 kΩ	**2322 195 13473**
56 kΩ	**2322 195 13563**
68 kΩ	**2322 195 13683**
82 kΩ	**2322 195 13823**
100 kΩ	**2322 195 13104**
120 kΩ	**2322 195 13124**
150 kΩ	**2322 195 13154**
180 kΩ	**2322 195 13184**
220 kΩ	**2322 195 13224**
270 kΩ	**2322 195 13274**
330 kΩ	**2322 195 13334**
390 kΩ	**2322 195 13394**
470 kΩ	**2322 195 13474**
560 kΩ	**2322 195 13564**
680 kΩ	**2322 195 13684**
820 kΩ	**2322 195 13824**
1 MΩ	**2322 195 13105**

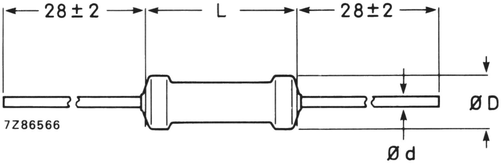
Cemented wirewound resistors: AC03, AC04

For detailed information on these and other types see Data Handbook C13
Standard packaging: 500 pieces, on tape, in box

Resistance range	0,1 Ω to 6,8 Ω, tol. ± 10%, E6–series 10 Ω to 1 kΩ, tol. ± 5%, E6–series
Max. body temperature	350 °C
Nom. dissipation at T_{amb} = 40 °C	
AC 03	3 W
AC 04	4 W

type	D_{max} mm	L_{max} mm	d mm	a ± 0.5 mm	A ± 4.0 mm	$B_1 - B_2$ ± max mm	S mm	T
AC03	5.5	13	0.8	5 or 6	66	1.2	10	1mm per 10 spacings
AC04	5.5	17	0.8	5 or 6	66	1.2	10	

See page R4 for tape drawing with dimensions



Status = P

R_N	tolerance %	AC03 cat. number	AC04 cat. number
0.1 Ω	10	**2322 329 33107**	**2322 329 34107**
0.15 Ω	10	**2322 329 33157**	**2322 329 34157**
0.22 Ω	10	**2322 329 33227**	**2322 329 34227**
0.33 Ω	10	**2322 329 33337**	**2322 329 34337**
0.47 Ω	10	**2322 329 33477**	**2322 329 34477**
0.68 Ω	10	**2322 329 33687**	**2322 329 34687**
1 Ω	10	**2322 329 33108**	**2322 329 34108**
1.5 Ω	10	**2322 329 33158**	**2322 329 34158**
2.2 Ω	10	**2322 329 33228**	**2322 329 34228**
3.3 Ω	10	**2322 329 33338**	**2322 329 34338**
4.7 Ω	10	**2322 329 33478**	**2322 329 34478**
6.8 Ω	10	**2322 329 33688**	**2322 329 34688**
10 Ω	5	**2322 329 03109**	**2322 329 04109**
15 Ω	5	**2322 329 03159**	**2322 329 04159**
22 Ω	5	**2322 329 03229**	**2322 329 04229**
33 Ω	5	**2322 329 03339**	**2322 329 04339**
47 Ω	5	**2322 329 03479**	**2322 329 04479**
68 Ω	5	**2322 329 03689**	**2322 329 04689**
100 Ω	5	**2322 329 03101**	**2322 329 04101**
150 Ω	5	**2322 329 03151**	**2322 329 04151**
220 Ω	5	**2322 329 03221**	**2322 329 04221**
330 Ω	5	**2322 329 03331**	**2322 329 04331**
470 Ω	5	**2322 329 03471**	**2322 329 04471**
680 Ω	5	**2322 329 03681**	**2322 329 04681**
1 kΩ	5	**2322 329 03102**	**2322 329 04102**

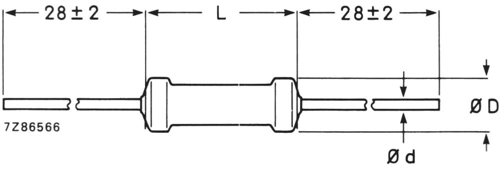
Cemented wirewound resistors (cont.): AC05, AC07

For detailed information on these and other types see Data Handbook C13
Standard packaging: 500 pieces, on tape, in box

Resistance range	0,1 Ω to 6,8 Ω, tol. ± 10%, E6–series 10 Ω to 1 kΩ, tol. ± 5%, E6–series
Max. body temperature	350 °C
Nom. dissipation at T_{amb} = 40 °C	
AC 05	5 W
AC 07	7 W

type	D_{max} mm	L_{max} mm	d mm	a ± 0.5 mm	A ± 4.0 mm	$B_1 - B_2$ ± max mm	S mm	T
AC05	7.5	17	0.8	6	66	1.2	10	1mm per 10 spacings
AC07	7.5	25	0.8	6	74	1.2	10	

See page R4 for tape drawing with dimensions



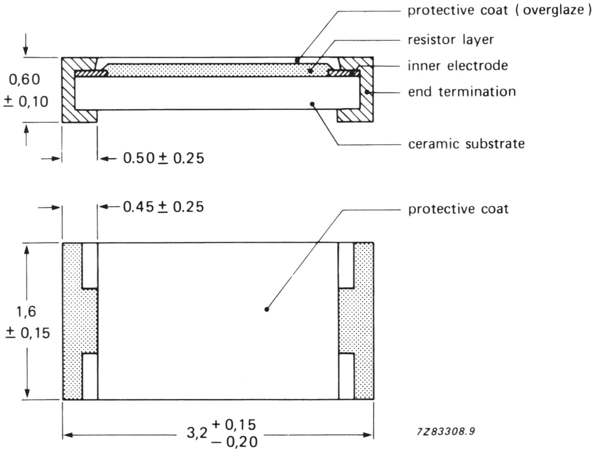
Status = P

R_N	tolerance %	AC05 cat. number	AC07 cat. number
0.1 Ω	10	**2322 329 35107**	**2322 329 37107**
0.15 Ω	10	**2322 329 35157**	**2322 329 37157**
0.22 Ω	10	**2322 329 35227**	**2322 329 37227**
0.33 Ω	10	**2322 329 35337**	**2322 329 37337**
0.47 Ω	10	**2322 329 35477**	**2322 329 37477**
0.68 Ω	10	**2322 329 35687**	**2322 329 37687**
1 Ω	10	**2322 329 35108**	**2322 329 37108**
1.5 Ω	10	**2322 329 35158**	**2322 329 37158**
2.2 Ω	10	**2322 329 35228**	**2322 329 37228**
3.3 Ω	10	**2322 329 35338**	**2322 329 37338**
4.7 Ω	10	**2322 329 35478**	**2322 329 37478**
6.8 Ω	10	**2322 329 35688**	**2322 329 37688**
10 Ω	5	**2322 329 05109**	**2322 329 07109**
15 Ω	5	**2322 329 05159**	**2322 329 07159**
22 Ω	5	**2322 329 05229**	**2322 329 07229**
33 Ω	5	**2322 329 05339**	**2322 329 07339**
47 Ω	5	**2322 329 05479**	**2322 329 07479**
68 Ω	5	**2322 329 05689**	**2322 329 07689**
100 Ω	5	**2322 329 05101**	**2322 329 07101**
150 Ω	5	**2322 329 05151**	**2322 329 07151**
220 Ω	5	**2322 329 05221**	**2322 329 07221**
330 Ω	5	**2322 329 05331**	**2322 329 07331**
470 Ω	5	**2322 329 05471**	**2322 329 07471**
680 Ω	5	**2322 329 05681**	**2322 329 07681**
1 kΩ	5	**2322 329 05102**	**2322 329 07102**

Chip resistors: RC–01

For detailed information on these and other types see Data Handbook C13
Standard packaging: 4000, in blister tape, on reel
See page R37 for additional packing information

Resistance range (E24–series)	1 to 10 MΩ (and 0 Ω jumper)
Lower tolerance on resistance	−5%
Upper tolerance on resistance	+5%
Temperature coefficient	200 10–6/K
Abs. max. dissipation at T_{amb} = 70 °C	0.25 W
Limiting voltage, r.m.s	200 V
Climatic category	55/155/56
at norm	IEC68
Basic specification	IEC115–1


protective coat (overglaze)
resistor layer
inner electrode
end termination
ceramic substrate
0,60
± 0,10
0.50 ± 0.25
0.45 ± 0.25
protective coat
1,6
± 0,15
$3,2^{+0,15}_{-0,20}$
7Z83308.9

Status = P

R_N Ω	catalogue number
1	**2322 712 30108**
1.1	**2322 712 30118**
1.2	**2322 712 30128**
1.3	**2322 712 30138**
1.5	**2322 712 30158**
1.6	**2322 712 30168**
1.8	**2322 712 30188**
2	**2322 712 30208**
2.2	**2322 712 30228**
2.4	**2322 712 30248**
2.7	**2322 712 30278**
3	**2322 712 30308**
3.3	**2322 712 30338**
3.6	**2322 712 30368**
3.9	**2322 712 30398**
4.3	**2322 712 30438**
4.7	**2322 712 30478**
5.1	**2322 712 30518**
5.6	**2322 712 30568**
6.2	**2322 712 30628**
6.8	**2322 712 30688**
7.5	**2322 712 30758**
8.2	**2322 712 30828**
9.1	**2322 712 30918**
10	**2322 712 30109**
11	**2322 712 30119**
12	**2322 712 30129**
13	**2322 712 30139**
15	**2322 712 30159**
16	**2322 712 30169**
18	**2322 712 30189**
20	**2322 712 30209**
22	**2322 712 30229**
24	**2322 712 30249**
27	**2322 712 30279**
30	**2322 712 30309**
33	**2322 712 30339**
36	**2322 712 30369**
39	**2322 712 30399**
43	**2322 712 30439**
47	**2322 712 30479**
51	**2322 712 30519**
56	**2322 712 30569**
62	**2322 712 30629**
68	**2322 712 30689**

Chip resistors: RC–01 (cont.)

For detailed information on these and other types see Data Handbook C13
Standard packaging: 4000, in blister tape, on reel
See page R37 for additional packing information

R_N	catalogue number
75 Ω	**2322 712 30759**
82 Ω	**2322 712 30829**
91 Ω	**2322 712 30919**
100 Ω	**2322 712 30101**
110 Ω	**2322 712 30111**
120 Ω	**2322 712 30121**
130 Ω	**2322 712 30131**
150 Ω	**2322 712 30151**
160 Ω	**2322 712 30161**
180 Ω	**2322 712 30181**
200 Ω	**2322 712 30201**
220 Ω	**2322 712 30221**
240 Ω	**2322 712 30241**
270 Ω	**2322 712 30271**
300 Ω	**2322 712 30301**
330 Ω	**2322 712 30331**
360 Ω	**2322 712 30361**
390 Ω	**2322 712 30391**
430 Ω	**2322 712 30431**
470 Ω	**2322 712 30471**
510 Ω	**2322 712 30511**
560 Ω	**2322 712 30561**
620 Ω	**2322 712 30621**
680 Ω	**2322 712 30681**
750 Ω	**2322 712 30751**
820 Ω	**2322 712 30821**
910 Ω	**2322 712 30911**
1 kΩ	**2322 712 30102**
1.1 kΩ	**2322 712 30112**
1.2 kΩ	**2322 712 30122**
1.3 kΩ	**2322 712 30132**
1.5 kΩ	**2322 712 30152**
1.6 kΩ	**2322 712 30162**
1.8 kΩ	**2322 712 30182**
2 kΩ	**2322 712 30202**
2.2 kΩ	**2322 712 30222**
2.4 kΩ	**2322 712 30242**
2.7 kΩ	**2322 712 30272**
3 kΩ	**2322 712 30302**
3.3 kΩ	**2322 712 30332**
3.6 kΩ	**2322 712 30362**
3.9 kΩ	**2322 712 30392**
4.3 kΩ	**2322 712 30432**
4.7 kΩ	**2322 712 30472**
5.1 kΩ	**2322 712 30512**

R_N	catalogue number
5.6 kΩ	**2322 712 30562**
6.2 kΩ	**2322 712 30622**
6.8 kΩ	**2322 712 30682**
7.5 kΩ	**2322 712 30752**
8.2 kΩ	**2322 712 30822**
9.1 kΩ	**2322 712 30912**
10 kΩ	**2322 712 30103**
11 kΩ	**2322 712 30113**
12 kΩ	**2322 712 30123**
13 kΩ	**2322 712 30133**
15 kΩ	**2322 712 30153**
16 kΩ	**2322 712 30163**
18 kΩ	**2322 712 30183**
20 kΩ	**2322 712 30203**
22 kΩ	**2322 712 30223**
24 kΩ	**2322 712 30243**
27 kΩ	**2322 712 30273**
30 kΩ	**2322 712 30303**
33 kΩ	**2322 712 30333**
36 kΩ	**2322 712 30363**
39 kΩ	**2322 712 30393**
43 kΩ	**2322 712 30433**
47 kΩ	**2322 712 30473**
51 kΩ	**2322 712 30513**
56 kΩ	**2322 712 30563**
62 kΩ	**2322 712 30623**
68 kΩ	**2322 712 30683**
75 kΩ	**2322 712 30753**
82 kΩ	**2322 712 30823**
91 kΩ	**2322 712 30913**
100 kΩ	**2322 712 30104**
110 kΩ	**2322 712 30114**
120 kΩ	**2322 712 30124**
130 kΩ	**2322 712 30134**
150 kΩ	**2322 712 30154**
160 kΩ	**2322 712 30164**
180 kΩ	**2322 712 30184**
200 kΩ	**2322 712 30204**
220 kΩ	**2322 712 30224**
240 kΩ	**2322 712 30244**
270 kΩ	**2322 712 30274**
300 kΩ	**2322 712 30304**
330 kΩ	**2322 712 30334**
360 kΩ	**2322 712 30364**
390 kΩ	**2322 712 30394**

R_N	catalogue number
430 kΩ	**2322 712 30434**
470 kΩ	**2322 712 30474**
510 kΩ	**2322 712 30514**
560 kΩ	**2322 712 30564**
620 kΩ	**2322 712 30624**
680 kΩ	**2322 712 30684**
750 kΩ	**2322 712 30754**
820 kΩ	**2322 712 30824**
910 kΩ	**2322 712 30914**
1 MΩ	**2322 712 30105**
1.1 MΩ	**2322 712 30115**
1.2 MΩ	**2322 712 30125**
1.3 MΩ	**2322 712 30135**
1.5 MΩ	**2322 712 30155**
1.6 MΩ	**2322 712 30165**
1.8 MΩ	**2322 712 30185**
2 MΩ	**2322 712 30205**
2.2 MΩ	**2322 712 30225**
2.4 MΩ	**2322 712 30245**
2.7 MΩ	**2322 712 30275**
3 MΩ	**2322 712 30305**
3.3 MΩ	**2322 712 30335**
3.6 MΩ	**2322 712 30365**
3.9 MΩ	**2322 712 30395**
4.3 MΩ	**2322 712 30435**
4.7 MΩ	**2322 712 30475**
5.1 MΩ	**2322 712 30515**
5.6 MΩ	**2322 712 30565**
6.2 MΩ	**2322 712 30625**
6.8 MΩ	**2322 712 30685**
7.5 MΩ	**2322 712 30755**
8.2 MΩ	**2322 712 30825**
9.1 MΩ	**2322 712 30915**
10 MΩ	**2322 712 30106**
0(jump)	**2322 712 90003**

Chip resistors: RC–01 (cont.)

For detailed information on these and other types see Data Handbook C13
Standard packaging: 4000, in paper tape, on reel
See page R37 for additional packing information

R_N	catalogue number
75 Ω	**2322 711 20759**
82 Ω	**2322 711 20829**
91 Ω	**2322 711 20919**
100 Ω	**2322 711 20101**
110 Ω	**2322 711 20111**
120 Ω	**2322 711 20121**
130 Ω	**2322 711 20131**
150 Ω	**2322 711 20151**
160 Ω	**2322 711 20161**
180 Ω	**2322 711 20181**
200 Ω	**2322 711 20201**
220 Ω	**2322 711 20221**
240 Ω	**2322 711 20241**
270 Ω	**2322 711 20271**
300 Ω	**2322 711 20301**
330 Ω	**2322 711 20331**
360 Ω	**2322 711 20361**
390 Ω	**2322 711 20391**
430 Ω	**2322 711 20431**
470 Ω	**2322 711 20471**
510 Ω	**2322 711 20511**
560 Ω	**2322 711 20561**
620 Ω	**2322 711 20621**
680 Ω	**2322 711 20681**
750 Ω	**2322 711 20751**
820 Ω	**2322 711 20821**
910 Ω	**2322 711 20911**
1 kΩ	**2322 711 20102**
1.1 kΩ	**2322 711 20112**
1.2 kΩ	**2322 711 20122**
1.3 kΩ	**2322 711 20132**
1.5 kΩ	**2322 711 20152**
1.6 kΩ	**2322 711 20162**
1.8 kΩ	**2322 711 20182**
2 kΩ	**2322 711 20202**
2.2 kΩ	**2322 711 20222**
2.4 kΩ	**2322 711 20242**
2.7 kΩ	**2322 711 20272**
3 kΩ	**2322 711 20302**
3.3 kΩ	**2322 711 20332**
3.6 kΩ	**2322 711 20362**
3.9 kΩ	**2322 711 20392**
4.3 kΩ	**2322 711 20432**
4.7 kΩ	**2322 711 20472**
5.1 kΩ	**2322 711 20512**

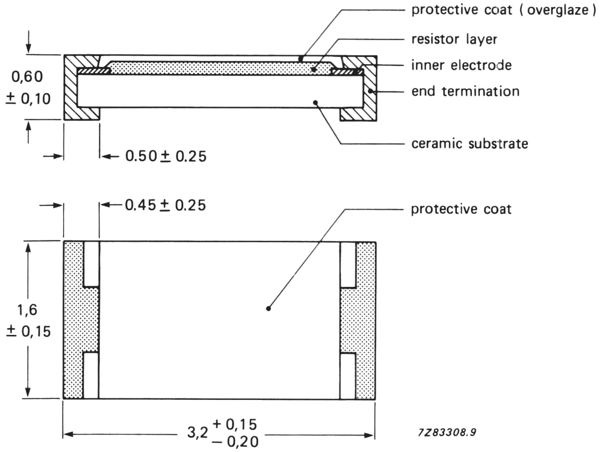
R_N	catalogue number
5.6 kΩ	**2322 711 20562**
6.2 kΩ	**2322 711 20622**
6.8 kΩ	**2322 711 20682**
7.5 kΩ	**2322 711 20752**
8.2 kΩ	**2322 711 20822**
9.1 kΩ	**2322 711 20912**
10 kΩ	**2322 711 20103**
11 kΩ	**2322 711 20113**
12 kΩ	**2322 711 20123**
13 kΩ	**2322 711 20133**
15 kΩ	**2322 711 20153**
16 kΩ	**2322 711 20163**
18 kΩ	**2322 711 20183**
20 kΩ	**2322 711 20203**
22 kΩ	**2322 711 20223**
24 kΩ	**2322 711 20243**
27 kΩ	**2322 711 20273**
30 kΩ	**2322 711 20303**
33 kΩ	**2322 711 20333**
36 kΩ	**2322 711 20363**
39 kΩ	**2322 711 20393**
43 kΩ	**2322 711 20433**
47 kΩ	**2322 711 20473**
51 kΩ	**2322 711 20513**
56 kΩ	**2322 711 20563**
62 kΩ	**2322 711 20623**
68 kΩ	**2322 711 20683**
75 kΩ	**2322 711 20753**
82 kΩ	**2322 711 20823**
91 kΩ	**2322 711 20913**
100 kΩ	**2322 711 20104**
110 kΩ	**2322 711 20114**
120 kΩ	**2322 711 20124**
130 kΩ	**2322 711 20134**
150 kΩ	**2322 711 20154**
160 kΩ	**2322 711 20164**
180 kΩ	**2322 711 20184**
200 kΩ	**2322 711 20204**
220 kΩ	**2322 711 20224**
240 kΩ	**2322 711 20244**
270 kΩ	**2322 711 20274**
300 kΩ	**2322 711 20304**
330 kΩ	**2322 711 20334**
360 kΩ	**2322 711 20364**
390 kΩ	**2322 711 20394**

R_N	catalogue number
430 kΩ	**2322 711 20434**
470 kΩ	**2322 711 20474**
510 kΩ	**2322 711 20514**
560 kΩ	**2322 711 20564**
620 kΩ	**2322 711 20624**
680 kΩ	**2322 711 20684**
750 kΩ	**2322 711 20754**
820 kΩ	**2322 711 20824**
910 kΩ	**2322 711 20914**
1 MΩ	**2322 711 20105**
1.1 MΩ	**2322 711 20115**
1.2 MΩ	**2322 711 20125**
1.3 MΩ	**2322 711 20135**
1.5 MΩ	**2322 711 20155**
1.6 MΩ	**2322 711 20165**
1.8 MΩ	**2322 711 20185**
2 MΩ	**2322 711 20205**
2.2 MΩ	**2322 711 20225**
2.4 MΩ	**2322 711 20245**
2.7 MΩ	**2322 711 20275**
3 MΩ	**2322 711 20305**
3.3 MΩ	**2322 711 20335**
3.6 MΩ	**2322 711 20365**
3.9 MΩ	**2322 711 20395**
4.3 MΩ	**2322 711 20435**
4.7 MΩ	**2322 711 20475**
5.1 MΩ	**2322 711 20515**
5.6 MΩ	**2322 711 20565**
6.2 MΩ	**2322 711 20625**
6.8 MΩ	**2322 711 20685**
7.5 MΩ	**2322 711 20755**
8.2 MΩ	**2322 711 20825**
9.1 MΩ	**2322 711 20915**
10 MΩ	**2322 711 20106**
0(jump)	**2322 711 90001**

Chip resistors: RC–02G

For detailed information on these and other types see Data Handbook C13
Standard packaging: 4000, in blister tape, on reel
See page R37 for additional packing information

Resistance range (E24–series)	100 Ω to 1 MΩ
Lower tolerance on resistance	– 1%
Upper tolerance on resistance	+ 1%
Temperature coefficient range	50 to 50 10–6/K
Abs. max. dissipation at T_{amb} = 70 °C	0.125 W
Maximum permissible voltage	200 V
Climatic category	55/125/56
at norm	IEC68
Basic specification	IEC115–1


protective coat (overglaze)
resistor layer
inner electrode
end termination
ceramic substrate
0,60
± 0,10
0.50 ± 0.25
0.45 ± 0.25
protective coat
1,6
± 0,15
3,2 + 0,15 − 0,20
7Z83308.9

Status = P

R_N	catalogue number
100 Ω	**2322 723 51001**
110 Ω	**2322 723 51101**
120 Ω	**2322 723 51201**
130 Ω	**2322 723 51301**
150 Ω	**2322 723 51501**
160 Ω	**2322 723 51601**
180 Ω	**2322 723 51801**
200 Ω	**2322 723 52001**
220 Ω	**2322 723 52201**
240 Ω	**2322 723 52401**
270 Ω	**2322 723 52701**
300 Ω	**2322 723 53001**
330 Ω	**2322 723 53301**
360 Ω	**2322 723 53601**
390 Ω	**2322 723 53901**
430 Ω	**2322 723 54301**
470 Ω	**2322 723 54701**
510 Ω	**2322 723 55101**
560 Ω	**2322 723 55601**
620 Ω	**2322 723 56201**
680 Ω	**2322 723 56801**
750 Ω	**2322 723 57501**
820 Ω	**2322 723 58201**
910 Ω	**2322 723 59101**
1 Ω	**2322 723 51002**
1.1 kΩ	**2322 723 51102**
1.2 kΩ	**2322 723 51202**
1.3 kΩ	**2322 723 51302**
1.5 kΩ	**2322 723 51502**
1.6 kΩ	**2322 723 51602**
1.8 kΩ	**2322 723 51802**
2 kΩ	**2322 723 52002**
2.2 kΩ	**2322 723 52202**
2.4 kΩ	**2322 723 52402**
2.7 kΩ	**2322 723 52702**
3 kΩ	**2322 723 53002**
3.3 kΩ	**2322 723 53302**
3.6 kΩ	**2322 723 53602**
3.9 kΩ	**2322 723 53902**
4.3 kΩ	**2322 723 54302**
4.7 kΩ	**2322 723 54702**
5.1 kΩ	**2322 723 55102**
5.6 kΩ	**2322 723 55602**
6.2 kΩ	**2322 723 56202**
6.8 kΩ	**2322 723 56802**

Chip resistors: RC–02G (cont.)

For detailed information on these and other types see Data Handbook C13
Standard packaging: 4000, in blister tape, on reel
See page R37 for additional packing information

R_N	catalogue number
7.5 kΩ	**2322 723 57502**
8.2 kΩ	**2322 723 58202**
9.1 kΩ	**2322 723 59102**
10 kΩ	**2322 723 51003**
11 kΩ	**2322 723 51103**
12 kΩ	**2322 723 51203**
13 kΩ	**2322 723 51303**
15 kΩ	**2322 723 51503**
16 kΩ	**2322 723 51603**
18 kΩ	**2322 723 51803**
20 kΩ	**2322 723 52003**
22 kΩ	**2322 723 52203**
24 kΩ	**2322 723 52403**
27 kΩ	**2322 723 52703**
30 kΩ	**2322 723 53003**
33 kΩ	**2322 723 53303**
36 kΩ	**2322 723 53603**
39 kΩ	**2322 723 53903**
43 kΩ	**2322 723 54303**
47 kΩ	**2322 723 54703**

R_N	catalogue number
51 kΩ	**2322 723 55103**
56 kΩ	**2322 723 55603**
62 kΩ	**2322 723 56203**
68 kΩ	**2322 723 56803**
75 kΩ	**2322 723 57503**
82 kΩ	**2322 723 58203**
91 kΩ	**2322 723 59103**
100 kΩ	**2322 723 51004**
110 kΩ	**2322 723 51104**
120 kΩ	**2322 723 51204**
130 kΩ	**2322 723 51304**
150 kΩ	**2322 723 51504**
160 kΩ	**2322 723 51604**
180 kΩ	**2322 723 51804**
200 kΩ	**2322 723 52004**
220 kΩ	**2322 723 52204**
240 kΩ	**2322 723 52404**
270 kΩ	**2322 723 52704**
300 kΩ	**2322 723 53004**
330 kΩ	**2322 723 53304**

R_N	catalogue number
360 kΩ	**2322 723 53604**
390 kΩ	**2322 723 53904**
430 kΩ	**2322 723 54304**
510 kΩ	**2322 723 55104**
560 kΩ	**2322 723 55604**
620 kΩ	**2322 723 56204**
680 kΩ	**2322 723 56804**
750 kΩ	**2322 723 57504**
820 kΩ	**2322 723 58204**
910 kΩ	**2322 723 59104**
1 MΩ	**2322 723 51005**

Chip resistors: RC–02H

For detailed information on these and other types see Data Handbook C13
Standard packaging: 4000, in paper tape, on reel
See page R37 for additional packing information

Resistance range (E24–series)	100 Ω to 1 MΩ
Lower tolerance on resistance	− 1%
Upper tolerance on resistance	+ 1%
Temperature coefficient range	± 100 x 10^{-6}/K
Abs. max. dissipation at T_{amb} = 70 °C	0.125 W
Maximum permissible voltage	200 V
Climatic category	55/125/56
at norm	IEC68
Basic specification	IEC115–1

Status = P

R_N	catalogue number
100 Ω	**2322 724 51001**
110 Ω	**2322 724 51101**
120 Ω	**2322 724 51201**
130 Ω	**2322 724 51301**
150 Ω	**2322 724 51501**
160 Ω	**2322 724 51601**
180 Ω	**2322 724 51801**
200 Ω	**2322 724 52001**
220 Ω	**2322 724 52201**
240 Ω	**2322 724 52401**
270 Ω	**2322 724 52701**
300 Ω	**2322 724 53001**
330 Ω	**2322 724 53301**
360 Ω	**2322 724 53601**
390 Ω	**2322 724 53901**
430 Ω	**2322 724 54301**
470 Ω	**2322 724 54701**
510 Ω	**2322 724 55101**
560 Ω	**2322 724 55601**
620 Ω	**2322 724 56201**
680 Ω	**2322 724 56801**
750 Ω	**2322 724 57501**
820 Ω	**2322 724 58201**
910 Ω	**2322 724 59101**
1 Ω	**2322 724 51002**
1.1 kΩ	**2322 724 51102**
1.2 kΩ	**2322 724 51202**
1.3 kΩ	**2322 724 51302**
1.5 kΩ	**2322 724 51502**
1.6 kΩ	**2322 724 51602**
1.8 kΩ	**2322 724 51802**
2 kΩ	**2322 724 52002**
2.2 kΩ	**2322 724 52202**
2.4 kΩ	**2322 724 52402**
2.7 kΩ	**2322 724 52702**
3 kΩ	**2322 724 53002**
3.3 kΩ	**2322 724 53302**
3.6 kΩ	**2322 724 53602**
3.9 kΩ	**2322 724 53902**
4.3 kΩ	**2322 724 54302**
4.7 kΩ	**2322 724 54702**
5.1 kΩ	**2322 724 55102**
5.6 kΩ	**2322 724 55602**
6.2 kΩ	**2322 724 56202**
6.8 kΩ	**2322 724 56802**

Chip resistors: RC–02H (cont.)

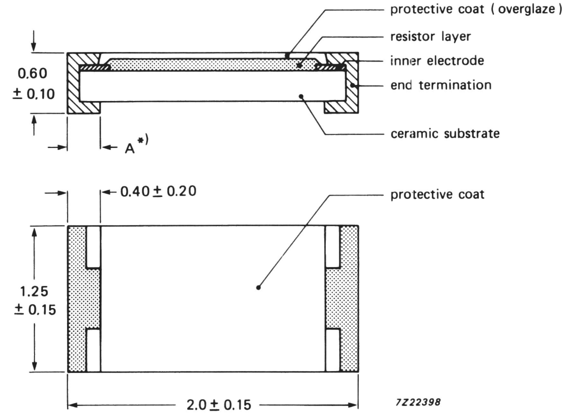
For detailed information on these and other types see Data Handbook C13
Standard packaging: 4000, in blister tape, on reel
See page R37 for additional packing information

R_N	catalogue number
7.5 kΩ	**2322 724 57502**
8.2 kΩ	**2322 724 58202**
9.1 kΩ	**2322 724 59102**
10 kΩ	**2322 724 51003**
11 kΩ	**2322 724 51103**
12 kΩ	**2322 724 51203**
13 kΩ	**2322 724 51303**
15 kΩ	**2322 724 51503**
16 kΩ	**2322 724 51603**
18 kΩ	**2322 724 51803**
20 kΩ	**2322 724 52003**
22 kΩ	**2322 724 52203**
24 kΩ	**2322 724 52403**
27 kΩ	**2322 724 52703**
30 kΩ	**2322 724 53003**
33 kΩ	**2322 724 53303**
36 kΩ	**2322 724 53603**
39 kΩ	**2322 724 53903**
43 kΩ	**2322 724 54303**
47 kΩ	**2322 724 54703**
51 kΩ	**2322 724 55103**
56 kΩ	**2322 724 55603**
62 kΩ	**2322 724 56203**
68 kΩ	**2322 724 56803**
75 kΩ	**2322 724 57503**
82 kΩ	**2322 724 58203**
91 kΩ	**2322 724 59103**
100 kΩ	**2322 724 51004**
110 kΩ	**2322 724 51104**
120 kΩ	**2322 724 51204**
130 kΩ	**2322 724 51304**
150 kΩ	**2322 724 51504**
160 kΩ	**2322 724 51634**
180 kΩ	**2322 724 51834**
200 kΩ	**2322 724 52004**
220 kΩ	**2322 724 52204**
240 kΩ	**2322 724 52004**
270 kΩ	**2322 724 52004**
300 kΩ	**2322 724 53004**
330 kΩ	**2322 724 53304**
360 kΩ	**2322 724 53604**
390 kΩ	**2322 724 53904**
430 kΩ	**2322 724 54304**
510 kΩ	**2322 724 55104**
560 kΩ	**2322 724 55604**
620 kΩ	**2322 724 56204**
680 kΩ	**2322 724 56804**
750 kΩ	**2322 724 57504**
820 kΩ	**2322 724 58204**
910 kΩ	**2322 724 59104**
1 MΩ	**2322 724 51005**

Chip resistors: RC-11

For detailed information on these and other types see Data Handbook C13
Standard packaging: 4000, in paper tape, on reel
See page R37 for additional packing information

Resistance range (E24–series)	1 Ω to 10 MΩ and jumper (0 Ω)
Lower tolerance on resistance	−5%
Upper tolerance on resistance	+5%
Temperature coefficient range	±200 x 10^{-6}/K
Abs. max. dissipation at T_{amb} = 70 °C	0.10 W
Maximum permissible voltage	150 V
Climatic category	55/125/56
at norm	IEC68
Basic specification	IEC115–1



Status = P

R_N	catalogue number
100 Ω	**2322 730 50101**
110 Ω	**2322 730 50111**
120 Ω	**2322 730 50121**
130 Ω	**2322 730 50131**
150 Ω	**2322 730 50151**
160 Ω	**2322 730 50161**
180 Ω	**2322 730 50181**
200 Ω	**2322 730 50201**
220 Ω	**2322 730 50221**
240 Ω	**2322 730 50241**
270 Ω	**2322 730 50271**
300 Ω	**2322 730 50301**
330 Ω	**2322 730 50331**
360 Ω	**2322 730 50361**
390 Ω	**2322 730 50391**
430 Ω	**2322 730 50431**
470 Ω	**2322 730 50471**
510 Ω	**2322 730 50511**
560 Ω	**2322 730 50601**
620 Ω	**2322 730 50621**
680 Ω	**2322 730 50681**
750 Ω	**2322 730 50751**
820 Ω	**2322 730 50821**
910 Ω	**2322 730 50801**
1 Ω	**2322 730 50102**
1.1 kΩ	**2322 730 50112**
1.2 kΩ	**2322 730 50122**
1.3 kΩ	**2322 730 50132**
1.5 kΩ	**2322 730 50152**
1.6 kΩ	**2322 730 50162**
1.8 kΩ	**2322 730 50182**
2 kΩ	**2322 730 50202**
2.2 kΩ	**2322 730 50222**
2.4 kΩ	**2322 730 50242**
2.7 kΩ	**2322 730 50272**
3 kΩ	**2322 730 50302**
3.3 kΩ	**2322 730 50332**
3.6 kΩ	**2322 730 50362**
3.9 kΩ	**2322 730 50392**
4.3 kΩ	**2322 730 50432**
4.7 kΩ	**2322 730 50472**
5.1 kΩ	**2322 730 50512**
5.6 kΩ	**2322 730 50562**
6.2 kΩ	**2322 730 50622**
6.8 kΩ	**2322 730 50682**

Chip resistors: RC–11 (cont.)

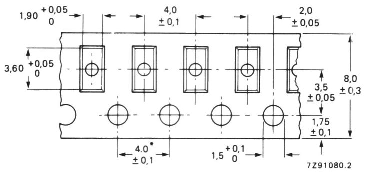
For detailed information on these and other types see Data Handbook C13
Standard packaging: 4000, in paper tape, on reel
See page R37 for additional packing information

R_N	catalogue number
7.5 kΩ	**2322 730 50752**
8.2 kΩ	**2322 730 50822**
9.1 kΩ	**2322 730 50912**
10 kΩ	**2322 730 50103**
11 kΩ	**2322 730 50113**
12 kΩ	**2322 730 50123**
13 kΩ	**2322 730 50133**
15 kΩ	**2322 730 50153**
16 kΩ	**2322 730 50163**
18 kΩ	**2322 730 50183**
20 kΩ	**2322 730 50203**
22 kΩ	**2322 730 50223**
24 kΩ	**2322 730 50243**
27 kΩ	**2322 730 50273**
30 kΩ	**2322 730 50303**
33 kΩ	**2322 730 50333**
36 kΩ	**2322 730 50363**
39 kΩ	**2322 730 50393**
43 kΩ	**2322 730 50433**
47 kΩ	**2322 730 50473**
51 kΩ	**2322 730 50513**
56 kΩ	**2322 730 50563**
62 kΩ	**2322 730 50623**
68 kΩ	**2322 730 50683**
75 kΩ	**2322 730 50753**
82 kΩ	**2322 730 50823**
91 kΩ	**2322 730 50913**
100 kΩ	**2322 730 50104**
110 kΩ	**2322 730 50114**
120 kΩ	**2322 730 50124**
130 kΩ	**2322 730 50134**
150 kΩ	**2322 730 50154**
160 kΩ	**2322 730 50164**
180 kΩ	**2322 730 50184**
200 kΩ	**2322 730 50204**
220 kΩ	**2322 730 50224**
240 kΩ	**2322 730 50244**
270 kΩ	**2322 730 50274**
300 kΩ	**2322 730 50304**
330 kΩ	**2322 730 50334**
360 kΩ	**2322 730 50364**
390 kΩ	**2322 730 50394**
430 kΩ	**2322 730 50434**
510 kΩ	**2322 730 50514**
560 kΩ	**2322 730 50564**
620 kΩ	**2322 730 50624**
680 kΩ	**2322 730 50684**
750 kΩ	**2322 730 50754**
820 kΩ	**2322 730 50824**
910 kΩ	**2322 730 50914**
1 MΩ	**2322 730 50105**
1.1 MΩ	**2322 730 50115**
1.2 MΩ	**2322 730 50125**
1.3 MΩ	**2322 730 50135**
1.5 MΩ	**2322 730 50155**
1.6 MΩ	**2322 730 50165**
1.8 MΩ	**2322 730 50185**
2 MΩ	**2322 730 50205**
2.2 MΩ	**2322 730 50225**
2.4 MΩ	**2322 730 50245**
2.7 MΩ	**2322 730 50275**
3 MΩ	**2322 730 50305**
3.3 MΩ	**2322 730 50335**
3.6 MΩ	**2322 730 50365**
3.9 MΩ	**2322 730 50395**
4.3 MΩ	**2322 730 50435**
4.7 MΩ	**2322 730 50475**
5.1 MΩ	**2322 730 50515**
5.6 MΩ	**2322 730 50565**
6.2 MΩ	**2322 730 50625**
6.8 MΩ	**2322 730 50685**
7.5 MΩ	**2322 730 50755**
8.2 MΩ	**2322 730 50825**
9.1 MΩ	**2322 730 50915**
10 MΩ	**2322 730 50106**
0 (jump)	**2322 730 90001**

RC–01 standard packaging

For complete details of RC–01 packaging see Data Handbook C13

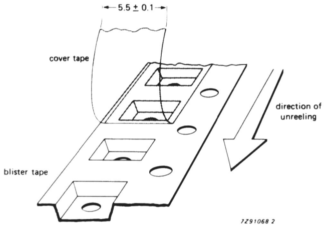
Standard packaging for RC–01; blister tape on reel.

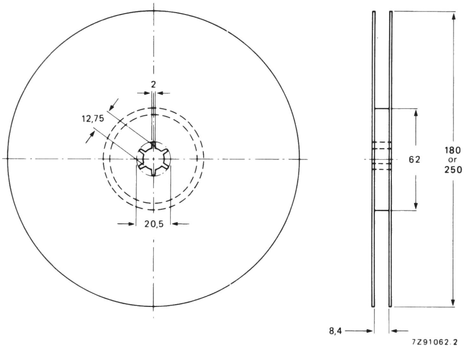

1,90 +0,05 0
4,0 ±0,1
2,0 ±0,05
3,60 +0,05 0
3,5 ±0,05
8,0 ±0,3
1,75 ±0,1
4,0* ±0,1
1,5 +0,1 0
7Z91080.2

Cumulative pitch error : 0,2 mm over 10 pitches

Blister tape

Reel


5.5 ± 0.1
cover tape
direction of unreeling
blister tape
7Z91068.2


2
12,75
20,5
62
180 or 250
8,4
7Z91062.2

depth of compartments: 0.7 mm

RSMD standard packaging

	RC–01	RC–02G	RC–02H	RC–11
Blister 4k	x	x	x	x
Blister 10k	x			
Paper 4k	x		x	x
Paper 5k	x		x	
Paper 10k	x			

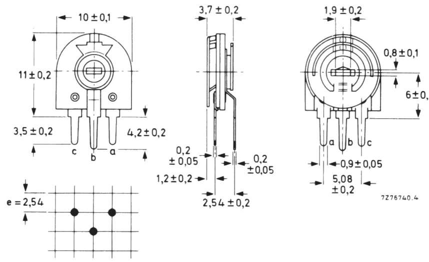
CARBON PRESET POTENTIOMETERS (10 mm)

General data

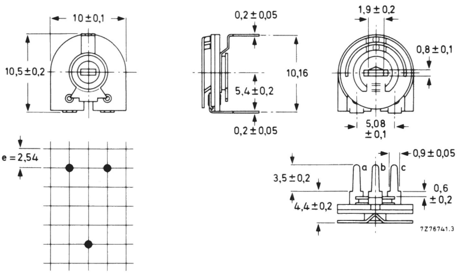
Open style OCP10

For detailed information on these and other types see Data Handbook C12

Resistance range (E3–series) linear law	47 Ω to 4.7 MΩ
Maximum dissipation at T_{amb} = 40 °C	0.1 W
Climatic category	25/070/21
at norm	IEC–68


10 ± 0,1
11 ± 0,2
3,5 ± 0,2
4,2 ± 0,2
c
b
a
e = 2,54
3,7 ± 0,2
0,2
± 0,05
1,2 ± 0,2
0,2
± 0,05
2,54 ± 0,2
1,9 ± 0,2
0,8 ± 0,1
6 ± 0,1
a
b
c
0,9 ± 0,05
5,08
± 0,2
7Z76740.4

vertical version


10 ± 0,1
10,5 ± 0,2
e = 2,54
0,2 ± 0,05
5,4 ± 0,2
10,16
0,2 ± 0,05
1,9 ± 0,2
0,8 ± 0,1
5,08
± 0,1
0,9 ± 0,05
a
b
c
3,5 ± 0,2
0,6
± 0,2
4,4 ± 0,2
7Z76741.3

horizontal version

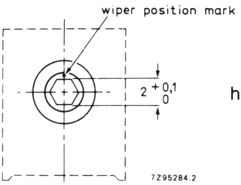
nominal resistance R_N	catalogue number	catalogue number
	vertical	horizontal
47 Ω	**2322 410 01191**	**2322 410 03391**
100 Ω	**2322 410 01151**	**2322 410 03351**
220 Ω	**2322 410 01152**	**2322 410 03352**
330 Ω	**2322 410 01169**	**2322 410 03369**
470 Ω	**2322 410 01153**	**2322 410 03353**
1 kΩ	**2322 410 01154**	**2322 410 03354**
2.2 kΩ	**2322 410 01155**	**2322 410 03355**
4.7 kΩ	**2322 410 01156**	**2322 410 03356**
10 kΩ	**2322 410 01157**	**2322 410 03357**
22 kΩ	**2322 410 01158**	**2322 410 03358**
47 kΩ	**2322 410 01159**	**2322 410 03359**
100 kΩ	**2322 410 01161**	**2322 410 03361**
220 kΩ	**2322 410 01162**	**2322 410 03362**
470 kΩ	**2322 410 01163**	**2322 410 03363**
1 MΩ	**2322 410 01164**	**2322 410 03364**
2.2 MΩ	**2322 410 01165**	**2322 410 03365**
4.7 MΩ	**2322 410 01166**	**2322 410 03366**

CARBON PRESET POTENTIOMETERS (10 mm) General data

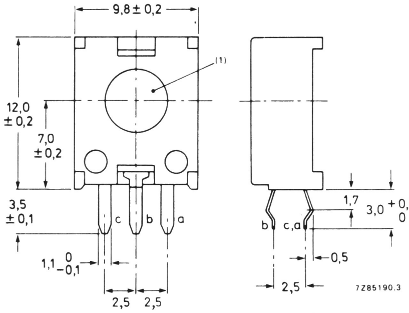
Enclosed style ECP10

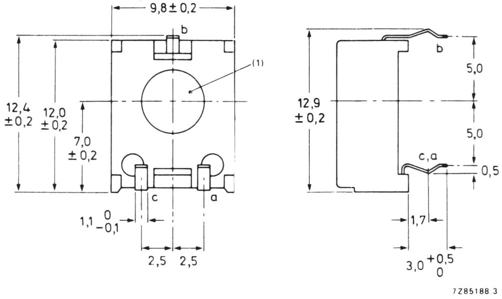
For detailed information on these and other types see Data Handbook C12

Resistance range (E3–series) linear law	100 Ω to 4.7 MΩ
Maximum dissipation at T_{amb} = 40 °C	$<$0.1 W
Lower tolerance on resistance	−20%
Upper tolerance on resistance	+20%
Temperature coefficient	±300 x 10^{-6}/K
Climatic category	25/085/10
at norm	IEC–68



hexagonal slot





(1) = insulated hexagonal slot
vertical version

horizontal version

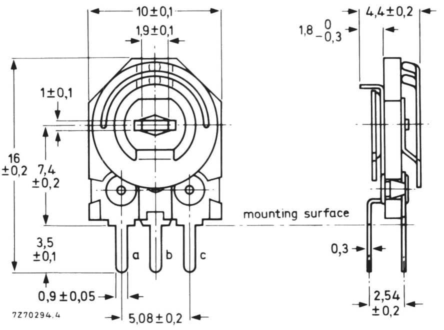
	catalogue no.	catalogue no.	catalogue no.	catalogue no.
nominal resistance R_N	hex slot/ snap–in pins vertical	hex slot/ snap–in pins horizontal	cross slot/ straight pins horizontal	hex slot/ straight pins horizontal
100 Ω	**2322 483 12101**	**2322 483 62101**	**2322 483 54101**	**2322 483 64101**
220 Ω	**2322 483 12221**	**2322 483 62221**	**2322 483 54221**	**2322 483 64221**
470 Ω	**2322 483 12471**	**2322 483 62471**	**2322 483 54471**	**2322 483 64471**
1 kΩ	**2322 483 12102**	**2322 483 62102**	**2322 483 54102**	**2322 483 64102**
2.2 kΩ	**2322 483 12222**	**2322 483 62222**	**2322 483 54222**	**2322 483 64222**
4.7 kΩ	**2322 483 12472**	**2322 483 62472**	**2322 483 54472**	**2322 483 64472**
10 kΩ	**2322 483 12103**	**2322 483 62103**	**2322 483 54103**	**2322 483 64103**
22 kΩ	**2322 483 12223**	**2322 483 62223**	**2322 483 54223**	**2322 483 64223**
47 kΩ	**2322 483 12473**	**2322 483 62473**	**2322 483 54473**	**2322 483 64473**
100 kΩ	**2322 483 12104**	**2322 483 62104**	**2322 483 54104**	**2322 483 64104**
220 kΩ	**2322 483 12224**	**2322 483 62224**	**2322 483 54224**	**2322 483 64224**
470 kΩ	**2322 483 12474**	**2322 483 62474**	**2322 483 54474**	**2322 483 64474**
1 MΩ	**2322 483 12105**	**2322 483 62105**	**2322 483 54105**	**2322 483 64105**
2.2 MΩ	**2322 483 12225**	**2322 483 62225**	**2322 483 54225**	**2322 483 64225**
4.7 MΩ	**2322 483 12475**	**2322 483 62475**	**2322 483 54475**	**2322 483 64475**

CARBON PRESET POTENTIOMETERS (10 mm)

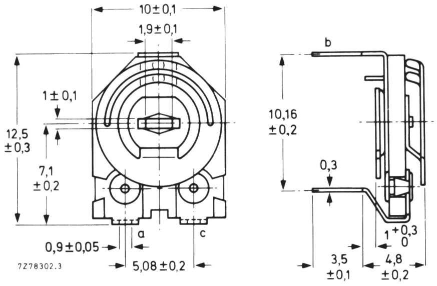
General data
OMP10

For detailed information on these and other types see Data Handbook C12

Resistance range (E3–series) linear law	100 Ω to 10 MΩ
Max. dissipation at T_{amb} = 40 °C	< 0.5 W
Lower tolerance on resistance	− 20%
Upper tolerance on resistance	+ 20%
Temperature coefficient	± 300 x 10^{-6}/K
Climatic category	55/125/56
at norm	IEC–68


10±0,1
1,9±0,1
1±0,1
16 ±0,2
7,4 ±0,2
3,5 ±0,1
0,9±0,05
5,08±0,2
a
b
c
7Z70294.4
1,8 0 −0,3
4,4±0,2
mounting surface
0,3
2,54 ±0,2

vertical version


10±0,1
1,9±0,1
1±0,1
12,5 ±0,3
7,1 ±0,2
0,9±0,05
5,08±0,2
a
c
7Z78302.3
b
10,16 ±0,2
0,3
1 +0,3 0
3,5 ±0,1
4,8 ±0,2

horizontal version

nominal resistance R_N	catalogue number	catalogue number
	vertical	horizontal
100 Ω	**2322 482 30101**	**2322 482 40101**
220 Ω	**2322 482 30221**	**2322 482 40221**
470 Ω	**2322 482 30471**	**2322 482 40471**
1 kΩ	**2322 482 30102**	**2322 482 40102**
2.2 kΩ	**2322 482 30222**	**2322 482 40222**
4.7 kΩ	**2322 482 30472**	**2322 482 40472**
10 kΩ	**2322 482 30103**	**2322 482 40103**
22 kΩ	**2322 482 30223**	**2322 482 40223**
47 kΩ	**2322 482 30473**	**2322 482 40473**
100 kΩ	**2322 482 30104**	**2322 482 40104**
220 kΩ	**2322 482 30224**	**2322 482 40224**
470 kΩ	**2322 482 30474**	**2322 482 40474**
1 MΩ	**2322 482 30105**	**2322 482 40105**
2.2 MΩ	**2322 482 30225**	**2322 482 40225**
4.7 MΩ	**2322 482 30475**	**2322 482 40475**
10 MΩ	**2322 482 30106**	**2322 482 40106**

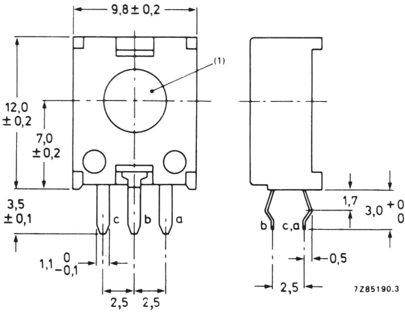
PHILIPS

CARBON PRESET POTENTIOMETERS (10 mm)

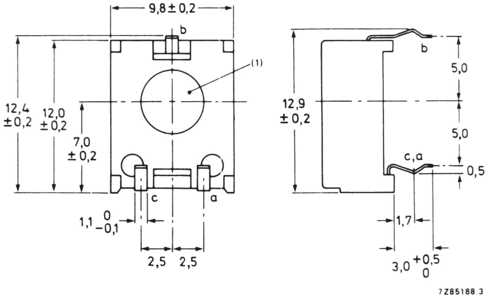
General data
EMP10

For detailed information on these and other types see Data Handbook C12

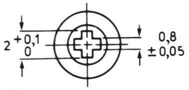
Resistance range (E6–series) linear law	47 Ω to 10 MΩ
Max. dissipation at T_{amb} = 40 °C	< 0.5 W
Lower tolerance on resistance	− 10%
Upper tolerance on resistance	+ 10%
Temperature coefficient	± 300 x 10^{-6}/K
Climatic category	55/125/56
at norm	IEC–68



vertical version



horizontal version



(1) = cross slot

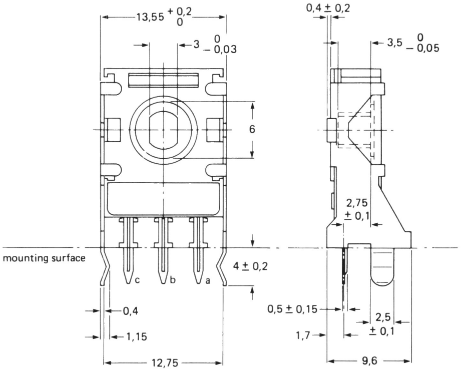
nominal resistance R_N	catalogue number vertical	catalogue number horizontal cross slot	catalogue number horizontal hexagonal slot
47 Ω	**2322 484 25479**	**2322 484 75479**	**2322 484 65479**
100 Ω	**2322 484 25101**	**2322 484 75101**	**2322 484 65101**
220 Ω	**2322 484 25221**	**2322 484 75221**	**2322 484 65221**
470 Ω	**2322 484 25471**	**2322 484 75471**	**2322 484 65471**
1 kΩ	**2322 484 25102**	**2322 484 75102**	**2322 484 65102**
2.2 kΩ	**2322 484 25222**	**2322 484 75222**	**2322 484 65472**
4.7 kΩ	**2322 484 25472**	**2322 484 75472**	**2322 484 65222**
10 kΩ	**2322 484 25103**	**2322 484 75103**	**2322 484 65103**
22 kΩ	**2322 484 25223**	**2322 484 75223**	**2322 484 65223**
47 kΩ	**2322 484 25473**	**2322 484 75473**	**2322 484 65473**
100 kΩ	**2322 484 25104**	**2322 484 75104**	**2322 484 65104**
220 kΩ	**2322 484 25224**	**2322 484 75224**	**2322 484 65224**
470 kΩ	**2322 484 25474**	**2322 484 75474**	**2322 484 65474**
1 MΩ	**2322 484 25105**	**2322 484 75105**	**2322 484 65105**
2.2 MΩ	**2322 484 25225**	**2322 484 75225**	**2322 484 65225**
4.7 MΩ	**2322 484 25475**	**2322 484 75475**	**2322 484 65475**
10 MΩ	**2322 484 25106**	**2322 484 75106**	**2322 484 65106**

CARBON PRESET POTENTIOMETERS, without spindle

Gen. data
PP12 series

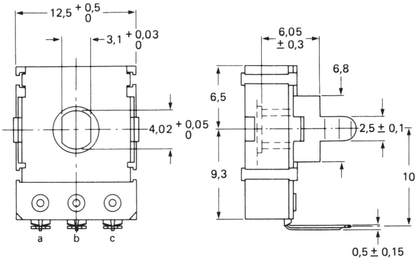
For detailed information on these and other types see Data Handbook C12

Resistance range (E3–series) linear law	470 Ω to 4.7 MΩ
Maximum dissipation at T_{amb} = 40 °C	< 0.2 W
Climatic category	25/070/10
at norm	IEC–68



13,55 $^{+0,2}_{0}$
3 $^{0}_{-0,03}$
6
mounting surface
c
b
a
4 ± 0,2
0,4
1,15
12,75
0,4 ± 0,2
3,5 $^{0}_{-0,05}$
2,75
± 0,1
0,5 ± 0,15
1,7
2,5
± 0,1
9,6

vertical version



12,5 $^{+0,5}_{0}$
3,1 $^{+0,03}_{0}$
4,02 $^{+0,05}_{0}$
a
b
c
6,05
± 0,3
6,8
6,5
2,5 ± 0,1
9,3
10
0,5 ± 0,15

horizontal version

nominal resistance R_N	catalogue number	catalogue number
	vertical	horizontal
470 Ω	**2322 505 00103**	**2322 505 00303**
1 kΩ	**2322 505 00104**	**2322 505 00304**
2.2 kΩ	**2322 505 00105**	**2322 505 00305**
4.7 kΩ	**2322 505 00106**	**2322 505 00306**
10 kΩ	**2322 505 00107**	**2322 505 00307**
22 kΩ	**2322 505 00108**	**2322 505 00308**
47 kΩ	**2322 505 00109**	**2322 505 00309**
100 kΩ	**2322 505 00111**	**2322 505 00311**
220 kΩ	**2322 505 00112**	**2322 505 00312**
470 kΩ	**2322 505 00113**	**2322 505 00313**
1 MΩ	**2322 505 00114**	**2322 505 00314**
2.2 MΩ	**2322 505 00115**	**2322 505 00315**
4.7 MΩ	**2322 505 00116**	**2322 505 00316**

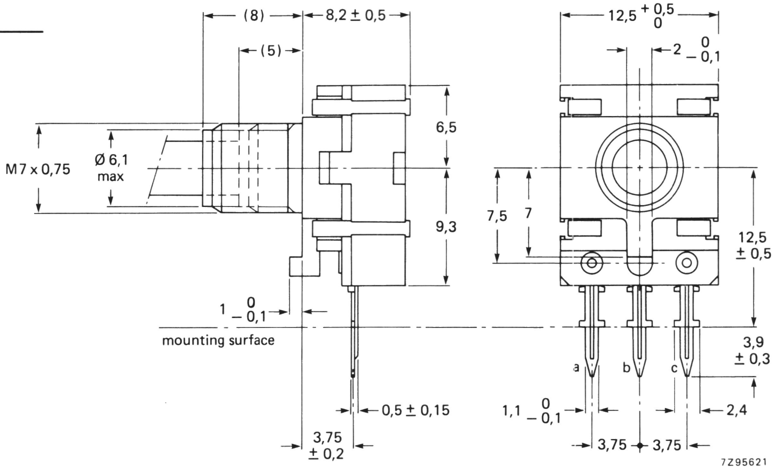
CARBON PRESET POTENTIOMETERS, single

Gen. data
PP12 series

For detailed information on these and other types see Data Handbook C12

Resistance range (E3–series) linear law	470 Ω to 4.7 MΩ
Max. dissipation at T_{amb} = 40 °C linear law	<0.2 W
Climatic category	25/070/10
at norm	IEC–68
Spindle material	METAL, PLASTIC

L (mm)	d (mm)
20	4
30	6



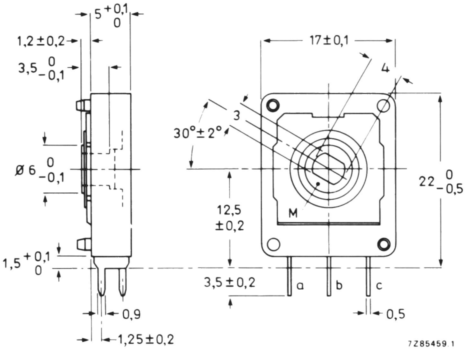
nominal resistance R_N	catalogue number flat metal spindle ∅ 4 x 20 (M7)	catalogue number round plastic spindle ∅ 4 x 20 (M7)	catalogue number round metal spindle ∅ 6 x 30 (M7)
	linear law	linear law	linear law
470 Ω	**2322 506 08103**	**2322 506 09103**	**2322 506 25103**
1 kΩ	**2322 506 08104**	**2322 506 09104**	**2322 506 25104**
2.2 kΩ	**2322 506 08105**	**2322 506 09105**	**2322 506 25105**
4.7 kΩ	**2322 506 08106**	**2322 506 09106**	**2322 506 25106**
10 kΩ	**2322 506 08107**	**2322 506 09107**	**2322 506 25107**
22 kΩ	**2322 506 08108**	**2322 506 09108**	**2322 506 25108**
47 kΩ	**2322 506 08109**	**2322 506 09109**	**2322 506 25109**
100 kΩ	**2322 506 08111**	**2322 506 09111**	**2322 506 25111**
220 kΩ	**2322 506 08112**	**2322 506 09112**	**2322 506 25112**
470 kΩ	**2322 506 08113**	**2322 506 09113**	**2322 506 25113**
1 MΩ	**2322 506 08114**	**2322 506 09114**	**2322 506 25114**
2.2 MΩ	**2322 506 08115**	**2322 506 09115**	**2322 506 25115**
4.7 MΩ	**2322 506 08116**	**2322 506 09116**	**2322 506 25116**

CARBON PRESET POTENTIOMETERS, without spindle

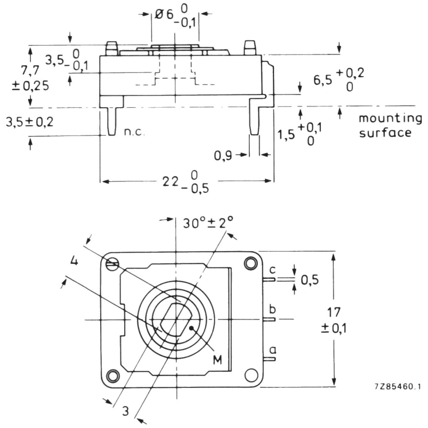
Gen. data
PP17 series

For detailed information on these and other types see Data Handbook C12

Resistance range (E3–series) linear law	220 Ω to 4.7 MΩ
Maximum dissipation at T_{amb} = 40 °C	< 0.2 W
Climatic category	25/070/10
at norm	IEC–68


5 +0,1 0
1,2±0,2
3,5 0 −0,1
Ø6 0 −0,1
1,5 +0,1 0
0,9
1,25±0,2
17±0,1
4
3
30°±2°
22 0 −0,5
12,5 ±0,2
M
3,5±0,2
a
b
c
0,5
7Z85459.1

vertical version


Ø6 0 −0,1
7,7 ±0,25
3,5 0 −0,1
6,5 +0,2 0
3,5±0,2
n.c.
1,5 +0,1 0
mounting surface
0,9
22 0 −0,5
30°±2°
4
c
0,5
b
17 ±0,1
a
M
3
7Z85460.1

horizontal version

nominal resistance R_N	catalogue number	catalogue number
	number vertical	number horizontal
220 Ω	**2322 500 00102**	**2322 500 00502**
470 Ω	**2322 500 00103**	**2322 500 00503**
1 kΩ	**2322 500 00104**	**2322 500 00504**
2.2 kΩ	**2322 500 00105**	**2322 500 00505**
4.7 kΩ	**2322 500 00106**	**2322 500 00506**
10 kΩ	**2322 500 00107**	**2322 500 00507**
22 kΩ	**2322 500 00108**	**2322 500 00508**
47 kΩ	**2322 500 00109**	**2322 500 00509**
100 kΩ	**2322 500 00111**	**2322 500 00511**
220 kΩ	**2322 500 00112**	**2322 500 00512**
470 kΩ	**2322 500 00113**	**2322 500 00513**
1 MΩ	**2322 500 00114**	**2322 500 00514**
2.2 MΩ	**2322 500 00115**	**2322 500 00515**
4.7 MΩ	**2322 500 00116**	**2322 500 00516**

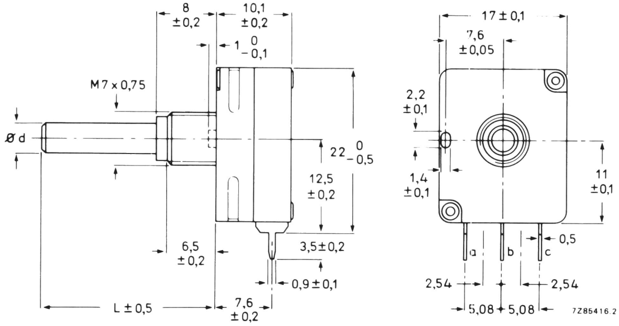
CARBON PRESET POTENTIOMETERS, single

General data
PP17 series

For detailed information on these and other types see Data Handbook C12

Resistance range (E3–series) linear law	220 Ω to 4.7 MΩ
Max. dissipation at T_{amb} = 40 °C linear law	< 0.2 W
Climatic category	25/070/10
at norm	IEC–68
Spindle material	METAL, PLASTIC

L (mm)	d (mm)
20	4
30	6


8
±0,2
10,1
±0,2
1 0 −0,1
M7 x 0,75
Ø d
22 0 −0,5
12,5
±0,2
6,5
±0,2
3,5±0,2
0,9±0,1
L ±0,5
7,6
±0,2
17 ± 0,1
7,6
±0,05
2,2
±0,1
1,4
±0,1
11
±0,1
0,5
a
b
c
2,54
2,54
5,08
5,08
7Z85416.2

nominalnce resistance R_N	catalogue number round plastic spindle ∅ 4 x 30(M7)	catalogue number round metal spindle ∅ 6 x 30 (M10)
	linearlaw	linear law
220 Ω	**2322 501 02102**	**2322 501 05102**
470 Ω	**2322 501 02103**	**2322 501 05103**
1 kΩ	**2322 501 02104**	**2322 501 05104**
2.2 kΩ	**2322 501 02105**	**2322 501 05105**
4.7 kΩ	**2322 501 02106**	**2322 501 05106**
10 kΩ	**2322 501 02107**	**2322 501 05107**
22 kΩ	**2322 501 02108**	**2322 501 05108**
47 kΩ	**2322 501 02109**	**2322 501 05109**
100 kΩ	**2322 501 02111**	**2322 501 05111**
220 kΩ	**2322 501 02112**	**2322 501 05112**
470 kΩ	**2322 501 02113**	**2322 501 05113**
1 MΩ	**2322 501 02114**	**2322 501 05114**
2.2 MΩ	**2322 501 02115**	**2322 501 05115**
4.7 MΩ	**2322 501 02116**	**2322 501 05116**

General data

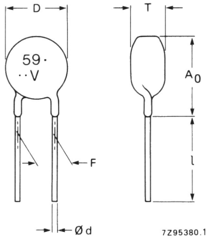
Epoxy series 2322 592 to 595

For detailed information on these and other types see Data Handbook C11

Max. a.c. voltage (r.m.s.)	30 to 550 V
Max. d.c. voltage	38 to 745 V
Max. non–repetitive transient current (8/20 μs)	100 to 4500 A
Climatic category	40/125/56
Packaging	BOX

Table1 Dimensions in mm

series	D max	T max	A_0 max	l min	d ±10%	F
2322 592	7	6	9	20	0.6	5.00 +0.8 −0.2
2322 593	9	6	11	19	0.6	5.00 +0,8 −0.2
2322 594	13.5	7	15.5	17	0.8	7.62 ± 1
2322 595	17	7	19	16	0.8	7.62 ± 1



For detailed information on these and other types see Data Handbook C11

catalogue number	maximum continuous voltage		voltage at 1 mA		max. voltage at current (8 x 20 µs)		max. energy 10 x 1000 µs J	max. non rep. surge current 8 x 20 µs A	typical capacitance at 1 kHz pF
	V r.m.s.	V d.c.	V min	V max	V	A			
2322 592 53006	30	38	42	52	96	1	1.1	100	560
2322 593 53006					93	2.5	2.3	250	1300
2322 594 53006					93	5	5.6	500	2200
2322 595 53006					90	10	10.4	1000	4800
2322 592 53506	35	45	50	62	123	1	1.1	100	560
2322 593 53506					115	2.5	2.3	250	1300
2322 594 53506					110	5	5.6	500	2200
2322 595 53506					105	10	10.4	1000	4800
2322 592 54006	40	56	61	75	145	1	1.2	100	460
2322 593 54006					135	2.5	3.0	250	1000
2322 594 54006					130	5	6.5	500	1800
2322 595 54006					130	10	13	1000	3800
2322 592 55006	50	65	74	90	145	5	1.9	400	370
2322 593 55006					140	10	4.2	1200	900
2322 594 55006					140	25	8.4	2500	1500
2322 595 55006					140	50	15	4500	3100
2322 592 56006	60	85	90	110	165	5	2.2	400	290
2322 593 56006					165	10	5.4	1200	700
2322 594 56006					165	25	10	2500	1200
2322 595 56006					165	50	20	4500	2300
2322 592 57506	75	100	108	132	190	5	2.7	400	240
2322 593 57506					200	10	6.3	1200	530
2322 594 57506					200	25	12	2500	1000
2322 595 57506					200	50	22	4500	1900
2322 592 59506	95	125	135	165	230	5	3.4	400	180
2322 593 59506					250	10	8	1200	450
2322 594 59506					250	25	16	2500	800
2322 595 59506					250	50	30	4500	1500
2322 592 51316	130	170	185	225	310	5	4.7	400	130
2322 593 51316					340	10	11.4	1200	320
2322 594 51316					340	25	20	2500	580
2322 595 51316					380	50	38	4500	1050

Epoxy series 2322 592 to 595 (cont.)

For detailed information on these and other types see Data Handbook C11

	maximum continuous voltage		voltage at 1 mA		max. voltage at current (8 x 20 µs)		max. energy 10 x 1000 µs	max. non rep. surge current 8 x 20 µs	typical capacitance at 1 kHz
catalogue number	V r.m.s.	V d.c.	V min	V max	V	A	J	A	pF
2322 592 51516	150	200	216	264	395	5	5,5	400	110
2322 593 51516					400	10	13	1200	270
2322 594 51516					400	25	25	2500	490
2322 595 51516					400	50	45	4500	850
2322 592 51716	175	225	247	303	410	5	6,2	400	90
2322 593 51716					455	10	15	1200	230
2322 594 51716					455	25	30	2500	430
2322 595 51716					455	50	55	4500	750
2322 592 52316	230	300	324	396	560	5	8	400	70
2322 593 52316					600	10	20	1200	170
2322 594 52316					600	25	35	2500	320
2322 595 52316					600	50	70	4500	540
2322 592 52516	250	320	351	429	600	5	8,6	400	60
2322 593 52516					650	10	21	1200	160
2322 594 52516					650	25	40	2500	300
2322 595 52516					650	50	72	4500	480
2322 592 52716	275	350	387	473	695	5	9,8	400	55
2322 593 52716					710	10	23	1200	140
2322 594 52716					710	25	45	2500	270
2322 595 52716					710	50	75	4500	440
2322 592 53016	300	385	423	517	750	5	10	400	50
2322 593 53016					800	10	25	1200	130
2322 594 53016					800	25	50	2500	240
2322 595 53016					800	50	90	4500	400
2322 592 53816	385	505	558	682	1000	5	14	400	40
2322 593 53816					1025	10	28	1200	95
2322 594 53816					1025	25	45	2500	180
2322 595 53816					1025	50	85	4500	280
2322 592 54216	420	560	612	748	1100	5	16	400	35
2322 593 54216					1120	10	30	1200	85
2322 594 54216					1120	25	46	2500	165
2322 595 54216					1120	50	90	4500	250
2322 592 54616	460	615	675	825	1200	5	20	400	30
2322 593 54616					1250	10	32	1200	75
2322 594 54616					1250	25	50	2500	150
2322 595 54616					1250	50	100	4500	225

Epoxy series 2322 592 to 595 (cont.)

For detailed information on these and other types see Data Handbook C11

	maximum continuous voltage		voltage at 1 mA		max. voltage at current (8 x 20 µs)		max. energy 10 x 1000 µs	max. non rep. surge current 8 x 20 µs	typical capacitance at 1 kHz
catalogue number	V r.m.s.	V d.c.	V min	V max	V	A	J	A	pF
2322 594 55116	510	670	738	902	1355	25	55	2500	135
2322 595 55116					1355	50	110	4500	210
2322 594 55516	550	745	819	1001	1500	25	60	2500	120
2322 595 55516					1500	50	120	4500	180

LIGHT DEPENDENT RESISTORS (LDRs)

General data
2322 600 9....

For detailed information on these and other types see Data Handbook C11

Fig. 1

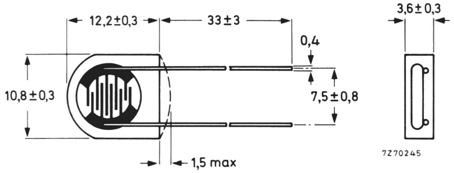

12,2±0,3
33±3
3,6±0,3
0,4
10,8±0,3
7,5±0,8
1,5 max
7Z70245

Fig. 2

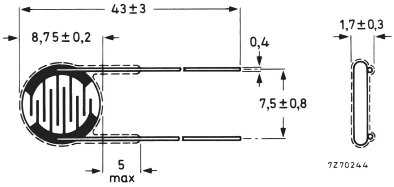
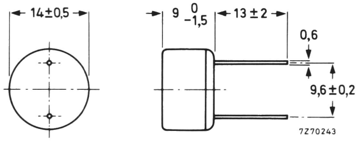

43±3
8,75±0,2
1,7±0,3
0,4
7,5±0,8
5
max
7Z70244

Fig. 3


14±0,5
9 0 −1,5
13±2
0,6
9,6±0,2
7Z70243

status = P

cat. number	resistance dark R_D	 light R_L	recovery time	Fig.	max dissipation at 40 °C W
2322 600 93001	min 10 MΩ	75 to 300 Ω	> 200 kΩ/s	1	0,1
2322 600 94001	min 10 MΩ	75 to 300 Ω	> 200 kΩ/s	2	0,1
2322 600 95001	min 10 MΩ	75 to 300 Ω	> 200 kΩ/s	3	0,2
2322 600 95003	min 10 MΩ	max 250 Ω	> 200 kΩ/s	3	0,2

PHILIPS

For details of these and other types see Data Handbook C11

Resistance at +25 °C	1 kΩ to 1 MΩ
$B_{25/85}$	2075 to 4100 K
Max. dissipation	< 100 mW
Dissipation factor	0.8 mW/K, 1.2 mW/K
Thermal time constant	7.5 to 10 s
Lower tolerance	−5%*, −10%
Upper tolerance	+5%*, +10%
Min. temperature	−55 °C
Max. temperature	+200 °C or +300 °

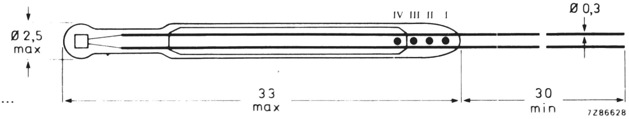


Fig. 1 2322 626 1....

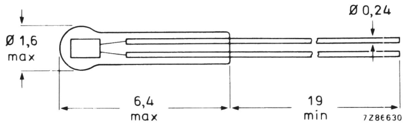


Fig. 2 2322 626 2....

status = P

cat. number	R_{25} kΩ	tolerance* %	thermal time constant s	T max °C	$B_{25/85}$ K	temperature coefficient at 25 °C %/K	Fig. no.
2322 626 12102	1	±10	10	200	2075	−2,3	1
2322 626 12222	2,2	±10	10	200	2285	−2,6	1
2322 626 12472	4,7	±10	10	200	2485	−2,8	1
2322 626 12103	10	±10	10	200	2750	−4,2	1
2322 626 12223	22	±10	10	200	3560	−4,0	1
2322 626 12473	47	±10	10	200	3750	−4,2	1
2322 626 12104	100	±10	10	300	3900	−4,4	1
2322 626 12224	220	±10	10	300	3860	−4,3	1
2322 626 12474	470	±10	10	300	3950	−4,5	1
2322 626 12105	1000	±10	10	300	4100	−4,6	1
2322 626 22102	1	±10	7,5	200	2075	−2,3	2
2322 626 22222	2,2	±10	7,5	200	2285	−2,6	2
2322 626 22472	4,7	±10	7,5	200	2485	−2,8	2
2322 626 22103	10	±10	7,5	200	3750	−4,2	2
2322 626 22223	22	±10	7,5	200	3560	−4,0	2
2322 626 22473	47	±10	7,5	200	3750	−4,2	2
2322 626 22104	100	±10	7,5	300	3900	−4,4	2
2322 626 22224	220	±10	7,5	300	3860	−4,3	2
2322 626 22474	470	±10	7,5	300	3950	−4,5	2
2322 626 22105	1000	±10	7,5	300	4100	−4,6	2

* To specify products with ±5% tolerance change 9th digit of catalogue number from **2** to **3** (e.g. 2322 626 12102 becomes **2322 626 13102** for ±5% tolerance) for details consult data handbook C11 or contact your local National Organization.

For details of these and other types see Data Handbook C11

Resistance at +25 °C	1 kΩ to 1 MΩ
$B_{25/85}$	2075 to 4100 K
Lower tolerance	−5%*, −10%
Upper tolerance	+5%*, +10%
Min. temperature	−55 °C
Max. temperature	+200 °C

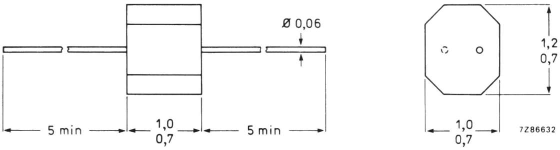


Fig. 1 2322 633 0....

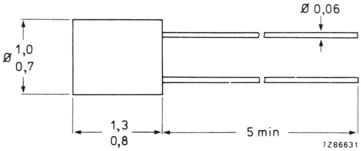


Fig. 2 2322 633 1....

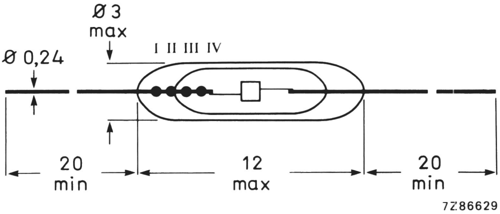
status = P

cat. number	R25 kΩ	tolerance* %	$B_{25/85}$ K	temperature coefficient at 25 °C %/K
2322 633 02102	1	±10	2075	−2.3
2322 633 02103	10	±10	3750	−4.2
2322 633 02104	100	±10	3900	−4.4
2322 633 02105	1000	±10	4100	−4.6
2322 633 02222	2.2	±10	2285	−2.6
2322 633 02223	22	±10	3560	−4
2322 633 02224	220	±10	3860	−4.1
2322 633 02472	4.7	±10	2485	−2.8
2322 633 02473	47	±10	3750	−4.2
2322 633 02474	470	±10	3950	−4.5
2322 633 12102	1	±10	2075	−2.3
2322 633 12103	10	±10	3750	−4.2
2322 633 12104	100	±10	3900	−4.4
2322 633 12105	1000	±10	4100	−4.6
2322 633 12222	2.2	±10	2285	−2.6
2322 633 12223	22	±10	3560	−4
2322 633 12224	220	±10	3860	−4.1
2322 633 12472	4.7	±10	2485	−2.8
2322 633 12473	47	±10	3750	−4.2
2322 633 12474	470	±10	3950	−4.5

* To specify products with ±5% tolerance change 9th of catalogue number from **2** to **3** (e.g. 2322 633 02102 becomes**2322 633 03102** for ±5% tolerance) for details consult data handbook C11 or contact your local National Organization

For detailed information on these and other types see Data Handbook C11

Resistance at +25 °C	1 kΩ to 1 MΩ
$B_{25/85}$	2075 to 4100 K
Max. dissipation	<60 mW
Dissipation factor	0.5 mW/K
Thermal time constant	5.5 s
Lower tolerance	−5%*, −10%
Upper tolerance	+5%*, +10%
Min. temperature	−55°C
Max. temperature	+200°C



status = P

cat. number	R25 kΩ	tolerance* %	$B_{25/85}$ K	temperature coefficient at 25 °C %/K
2322 633 22102	1	±10	2075	–2.3
2322 633 22103	10	±10	3750	–4.2
2322 633 22104	100	±10	3900	–4.4
2322 633 22105	1000	±10	4100	–4.6
2322 633 22222	2.2	±10	2285	–2.6
2322 633 22223	22	±10	3560	–4
2322 633 22224	220	±10	3860	–4.3
2322 633 22472	4.7	±10	2485	–2.8
2322 633 22473	47	±10	3570	–4.2
2322 633 22474	470	±10	3950	–4.5

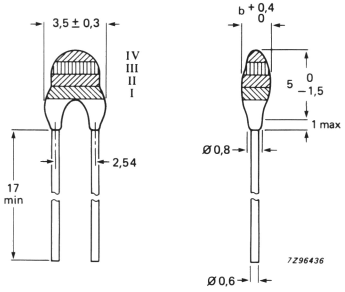
* To specify products with ±5% tolerance change 9th digit of catalogue number from **2** to **3** (e.g. 2322 633 22102 becomes **2322 633 23102** for ±5% tolerance) for details consult data handbook C11 or contact your local National Organization

Extended accuracy range

For detailed information on these and other types see Data Handbook C11

Resistance at +25 °C	2.7 kΩ to 470 kΩ
Tolerance	±5%, ±10%
$B_{25/85}$ tolerance	0.75% to 3%
Max. dissipation	250 mW
Dissipation factor	7 mW/K
Thermal time constant	11 s approx.
Temperature range	−40 to +125°C short period to +150°C*

* For types indicated with * in table



R_{25} kΩ	$B_{25/85}$ K	$B_{25/85}$ tolerance %	catalogue number R_{25} ±5%	 R_{25} ±10%
2.7*	3977	0.75	**2322 640 63272**	**2322 640 62272**
3.3*	3977	0.75	**2322 640 63332**	**2322 640 62332**
4.7*	3977	0.75	**2322 640 63472**	**2322 640 62472**
6.8*	3977	0.75	**2322 640 63682**	**2322 640 62682**
10*	3977	0.75	**2322 640 63103**	**2322 640 62103**
12	3740	3.00	**2322 640 63123**	**2322 640 62123**
15	3740	3.00	**2322 640 63153**	**2322 640 62153**
22	3740	3.00	**2322 640 63223**	**2322 640 62223**
33*	4100	2.00	**2322 640 63333**	**2322 640 62333**
47*	4100	2.00	**2322 640 63473**	**2322 640 62473**
68*	4190	2.00	**2322 640 63683**	**2322 640 62683**
100*	4190	2.00	**2322 640 63104**	**2322 640 62104**
150	4370	3.00	**2322 640 63154**	**2322 640 62154**
220	4370	3.00	**2322 640 63224**	**2322 640 62224**
330	4570	3.00	**2322 640 63334**	**2322 640 62334**
470	4570	3.00	**2322 640 63474**	**2322 640 62474**

Low real loss accuracy range

For detailed information on these and other types see Data Handbook C11

Resistance at +25 °C	2.7 kΩ to 470 kΩ
Tolerance	±1%, ±3%
$B_{25/85}$ tolerance	0.75% to 3%
Max. dissipation	200 mW
Dissipation factor	2.2 mW/K
Thermal time constant	13 s approx.
Temperature range	−40 to +125°C short period to +150°C*

* For types indicated with * in table

R_{25} kΩ	$B_{25/85}$ K	$B_{25/85}$ tolerance %	catalogue number	
			R_{25} ±1%	R_{25} ±3%
2.7*	3977	0.75	**2322 640 55272**	**2322 640 56272**
4.7*	3977	0.75	**2322 640 55472**	**2322 640 56472**
10*	3977	0.75	**2322 640 55103**	**2322 640 56103**
47*	4100	2.00		**2322 640 56473**
100*	4190	2.00		**2322 640 56104**
470	4570	3.00	**322 640 63123**	**2322 640 56474**

NTC THERMISTORS (cont.)

General data
2322 645 .....

For detailed information on these and other types see Data Handbook C11

Resistance at +25°C		1kΩ to 10kΩ
Tolerance		±5% and ±10%*
$B_{25/75}$		3965 K ±1.25%, ±0.75%
Max. dissipation	2322 645 0....	0.25 W
	2322 645 2....	0.25 W
	2322 645 4....	0.75 W
Temperature range		−40 to +125 °C

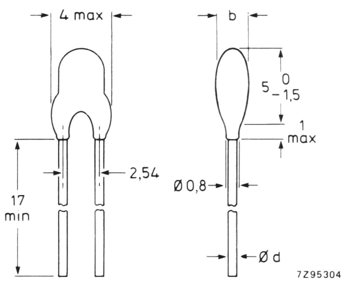


Fig.1 645 0.... types

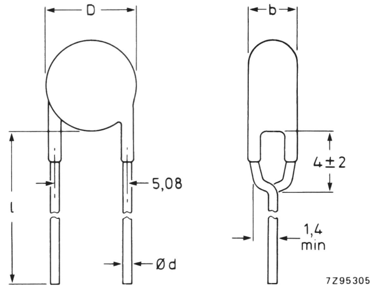


Fig.2 645 2.... and 645 4.... types

status = P

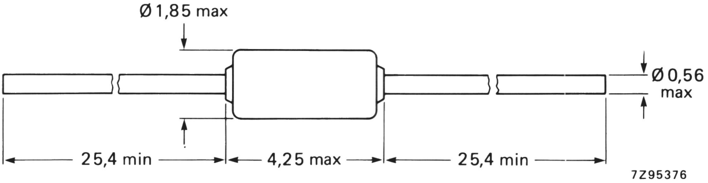
cat. number	R_{25} kΩ	tolerance* %	Fig. no.	D mm	d mm	b mm	l mm
2322 645 02502	5	10	1	–	0.6	2.2	–
2322 645 02602	6	10	1	–	0.6	2.3	–
2322 645 02802	8	10	1	–	0.6	2.5	–
2322 645 02103	10	10	1	–	0.6	2.8	–
2322 645 22202	2	10	2	6	0.6	2.8	30.5
2322 645 22252	2.5	10	2	6	0.6	3.1	30.5
2322 645 22302	3	10	2	6	0.6	3.3	30.5
2322 645 22502	5	10	2	6	0.6	4.4	30.5
2322 645 42102	1	10	2	8.5	0.6	3.0	28
2322 645 42202	2	10	2	8.5	0.6	4.1	28

* To specify products with ±10% tolerance change 9th digit of catalogue number from **2** to **3** (e.g. 2322 645 02502 becomes **2322 645 03502** for ±5% tolerance) for details consult data handbook C11 or contact your local National Organization

General data
2322 633 72224

For details of these and other types see Data Handbook C11

Resistance at +25 °C	220 kΩ ±10% or ±5% (2322 633 73224)
$B_{25/85}$	3797 K ±3%
Max. dissipation	100 mW
Max. temperature	+300 °C

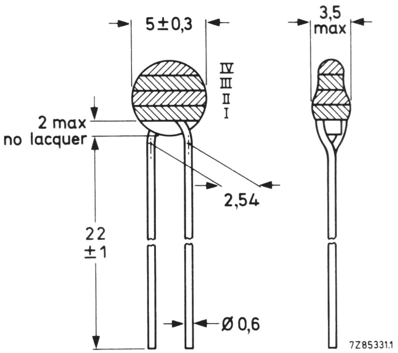

Ø 1,85 max
Ø 0,56 max
25,4 min
4,25 max
25,4 min
7Z95376

NTC THERMISTORS (cont.)

General data
2322 642 6....

For detailed information on these and other types see Data Handbook C11

Resistance range at +25 °C (E6–series)	3.3 kΩ to 470 kΩ
Tolerance	±5%* and ±10%
$B_{25/85}$	2675 to 4650 K
Max. dissipation	0.5 W
Dissipation factor	8.5 mW/K
Thermal time constant	17 s approx.
Temperature range	−25 to +125 °C



status = P

cat. number	R_{25} kΩ	tolerance* %	$B_{25/85}$ K	temperature coefficient %/K
2322 642 62332	3.3	±10	4250	−4,8
2322 642 62472	4.7	±10	4350	−4,9
2322 642 62682	6.8	±10	4400	−5,0
2322 642 62103	10	±10	4275	−4,8
2322 642 62153	15	±10	4200	−4,7
2322 642 62223	22	±10	4275	−4,8
2322 642 62333	33	±10	4350	−4,9
2322 642 62473	47	±10	4400	−5,0
2322 642 62683	68	±10	4450	−5,1
2322 642 62104	100	±10	4500	−5,2
2322 642 62154	150	±10	4550	−5,2
2322 642 62224	220	±10	4600	−5,3
2322 642 62334	330	±10	4625	−5,3
2322 642 62474	470	±10	4650	−5,4

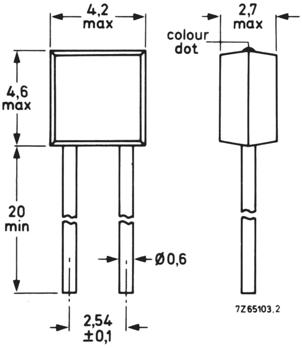
* To specify products with ±5% tolerance change 9th digit of catalogue number from **2** to **3** (e.g. 2322 642 62338 becomes **2322 642 63338** for ±5% tolerance) for details consult data handbook C11 or contact your local National Organization

NTC THERMISTORS (cont.)

Special accuracy range

For detailed information on these and other types see Data Handbook C11

Resistance	12 to 16.7 kΩ
$B_{25/85}$	3740 to 4300 K
Max. dissipation	250 mW
Dissipation factor	7 mW/K
Thermal time constant	
2322 640 9000.	19 s approx.
2322 640 90015	17 s approx.
Temperature range	
2322 640 90004	− 10 to + 125°C
2322 640 90005	− 25 to + 200°C
2322 640 90015	− 40 to + 125°C



status = P

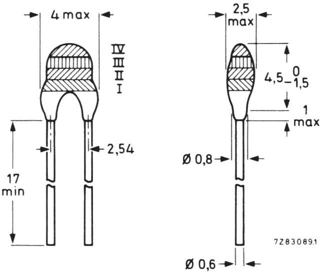
cat. number	R_{25} kΩ	tolerance R_{25} °C	R_{100} Ω	tolerance R_{100} °C	$B_{25/85}$ K
2322 640 90004	12	± 1.7	950	± 1.8	3740

cat. number	R_{100} kΩ	tolerance R_{100} %	R_{200} kΩ	tolerance R_{200} %	$B_{25/85}$ K
2322 640 90005	16.7	± 7	11.2	± 7	4300

cat. number	R_{10} kΩ	tolerance R_{10} °C	R_{25} kΩ	tolerance R_{25} °C	$B_{25/85}$ K
2322 640 90015	16.7	± 7	11.2	± 7	3977

For detailed information on these and other types see Data Handbook C11

Resistance	4.7 kΩ to 164.2 kΩ
$B_{25/85}$	3977 to 4190 K
Max. dissipation	250 mW
Dissipation factor	
2322 640 10...	7 mW/K approx.
2322 640 90...	7.5 mW/K approx.
Thermal time constant	
640 10...	11 s approx.
640/645 9001.	8 s approx.
640 90031	11 s approx.
Temperature range	
640 10...	−40 to +125°C
640 90012	−55 to +125°C
640/645 900..	−40 t0 +125°C



status = P

cat. number	R_{25} kΩ	tolerance R_{25} °C	R_{85} Ω	tolerance R_{85} °C	$B_{25/85}$ K		
2322 640 10472	4.7	0.5	502.9	0.5	3977		
2322 640 10103	10	0.5	1070	0.5	3977		
2322 640 10473	47	0.5	4694	0.5	4100		
2322 640 10104	100	0.5	9498	0.5	4120		

cat. number	R_{30} kΩ	tolerance R_{30} °C	R_{20} kΩ	tolerance R_{20} °C	R_{10} kΩ	tolerance R_{10} °C	$B_{25/85}$ K
2322 640 90012	50	±1.5	20	±1.5	15	±1.5	3977

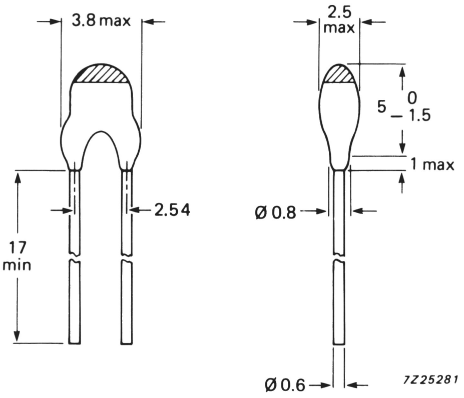
cat. number	R_0 kΩ	tolerance R_0 °C	R_{25} Ω	tolerance R_{25} °C	$B_{25/85}$ K		
2322 640 90031	9	±0.4	2.756	±0.9	3977		

cat. number	R_{40} kΩ	tolerance R_{40} °C	R_{25} kΩ	tolerance R_{25} °C	R_{50} kΩ	tolerance R_{50} °C	$B_{25/85}$ K
2322 645 90015	164.2	±0.75	5	±0.7	1.803	±0.9	3977

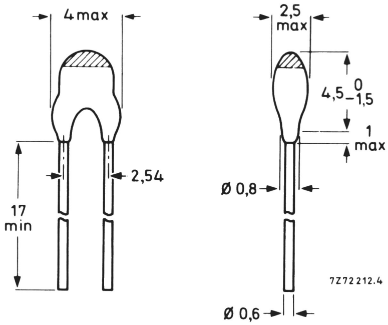
cat. number	R_{10} kΩ	tolerance R_{10} °C	R_{25} Ω	tolerance R_{25} °C	$B_{25/85}$ K		
2322 640 90014	15	±1.5	2.7	±1.5	3977		

For detailed information on these and other types see Data Handbook C11

Resistance	5 kΩ to 32.51 kΩ
$B_{25/85}$	3977 K
Max. dissipation	250 mW
Dissipation factor	7.5 mW/K
Thermal time constant	11 s approx.
Temperature range	−40 to +125°C


3.8 max
2.54
17
min
2.5
max
5 $^{0}_{-1.5}$
1 max
Ø 0.8
Ø 0.6
7Z25281

2322 640 90012 only.


4 max
2,54
17
min
2,5
max
4,5 $^{0}_{-1,5}$
1
max
Ø 0,8
Ø 0,6
7Z72212.4

2322 640 90014 only.

status = P

cat. number	R_0 kΩ	tolerance R_0 °C	R_{25} kΩ	tolerance R_{25} °C	R_{75} kΩ	tolerance R_{75} °C	$B_{25/85}$ K
2322 645 90001	32.51	±0.5	10	±0.5	14.81	±1.2	3977

cat. number	R_{25} kΩ	tol. R_{25} °C	$B_{25/85}$ K	tol. $B_{25/85}$ %			
2322 645 90022	5	±0.5	3977	0.5			

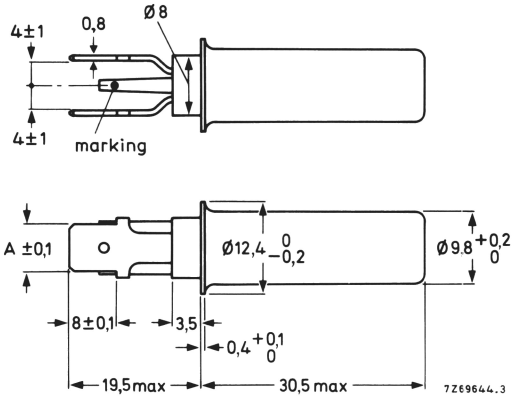
Long and/or isolated leads

For detailed information on these and other types see Data Handbook C11

non–isolated leads **2322 645 90028**	isolated leads **2322 640 90056**
R_{25} 10 kΩ ±5%	R_0 66.76 kΩ ±5%
	R_{25} 22.19 kΩ ±6.75%
$B_{25/85}$ 3977 K	$B_{25/85}$ 3740 K
Max. dissipation 100 mW	Max. dissipation 400 mW
Temperature range −40 to +125°C	Temperature range −40 to +125°C

Other resistance values, tolerances and lead lengths are available upon request.

For detailed information on these and other types see Data Handbook C11

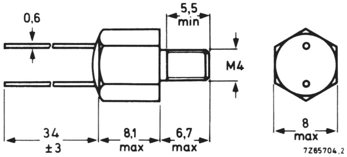

Ø8
0,8
4±1
4±1
marking
A ±0,1
Ø12,4 $^{0}_{-0,2}$
Ø9,8 $^{+0,2}_{0}$
8±0,1
3,5
0,4 $^{+0,1}_{0}$
19,5max
30,5 max
7Z69644.3

Steelcap range

	2322 640 90024 2322 640 90025	2322 640 90034
R_{25}	12 kΩ ±5.5%	12 kΩ ±7%
R_{35}	–	1.475 kΩ ±5%
R_{100}	950 Ω ±3.5%	–
Operating temperature range at 0 power continuously	−25 to +110°C	−25 to +110°C
for 24 hours max.	130°C	130°C

For detailed information on these and other types see Data Handbook C11

Resistance range at +25 °C (E3–series)	3.3 Ω to 470 kΩ
Tolerance	±5%* and ±10%
$B_{25/85}$	2675 to 4650 K
Max. dissipation	0.5 W
Dissipation factor	25 mW/K
Thermal time constant	20 s approx.
Temperature range	−25 to +100 °C



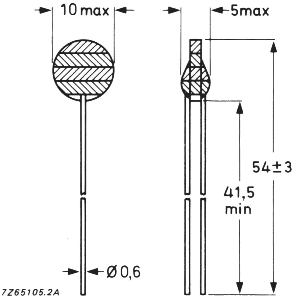
status = P

cat. number	R_{25}	tolerance* %	$B_{25/85}$ K	temperature coefficient %/K
2322 642 72338	3.3 Ω	±10	2675	−3.0
2322 642 72478	4.7 Ω	±10	2750	−3.1
2322 642 72688	6.8 Ω	±10	2800	−3.2
2322 642 72109	10 Ω	±10	2875	−3.2
2322 642 72159	15 Ω	±10	2950	−3.3
2322 642 72229	22 Ω	±10	3025	−3.4
2322 642 72339	33 Ω	±10	3100	−3.5
2322 642 72479	47 Ω	±10	3150	−3.5
2322 642 72689	68 Ω	±10	3225	−3.6
2322 642 72101	100 Ω	±10	3300	−3.7
2322 642 72151	150 Ω	±10	3375	−3.8
2322 642 72221	220 Ω	±10	3475	−3.9
2322 642 72331	330 Ω	±10	3575	−4,0
2322 642 72471	470 Ω	±10	3650	−4.1
2322 642 72681	680 Ω	±10	3725	−4.2
2322 642 72102	1.0 kΩ	±10	3825	−4.3
2322 642 72152	1.5 kΩ	±10	3975	−4.5
2322 642 72222	2.2 kΩ	±10	4125	−4.6
2322 642 72332	3.3 kΩ	±10	4250	−4.8
2322 642 72472	4.7 kΩ	±10	4350	−4.9
2322 642 72682	6.8 kΩ	±10	4400	−5.0
2322 642 72103	10 kΩ	±10	4275	−4.8
2322 642 72153	15 kΩ	±10	4200	−4.7
2322 642 72223	22 kΩ	±10	4275	−4.8
2322 642 72333	33 kΩ	±10	4350	−4.9
2322 642 72473	47 kΩ	±10	4400	−5.0
2322 642 72683	68 kΩ	±10	4450	−5.0
2322 642 72104	100 kΩ	±10	4500	−5.1
2322 642 72154	150 kΩ	±10	4550	−5.1
2322 642 72224	220 kΩ	±10	4600	−5.2
2322 642 72334	330 kΩ	±10	4625	−5.2
2322 642 72474	470 kΩ	±10	4650	−5.2

* To specify products with ±5% tolerance change 9th digit of catalogue number from **2** to **3** (e.g. 2322 642 72338 becomes **2322 642 73338** for ±5% tolerance) for details consult data handbook C11 or contact your local National Organization

Surge current limiting range

For detailed information on these and other types see Data Handbook C11



Low power range

cat. number	R at 25°C Ω	max continuous power 0–55°C W	current at max power 25°C A	approx. dissipation factor mW/K	size
2322 610 12408	4	1	2	10	2
2322 610 12808	8	1	1.5	10	2
2322 610 12159	15	1	1.1	10	2
2322 610 12339	33	1	0.7	10	2
2322 610 11408	4	1	2	10	2
2322 610 11808	8	1	1.5	10	2
2322 610 11159	15	1	1.1	10	2
2322 610 11339	33	1	0.7	10	2

Tolerance = 10% for 2322 610 12... and 20% for 2322 610 11...

For detailed information on these and other types see Data Handbook C11

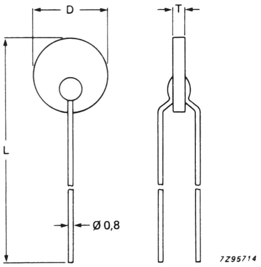
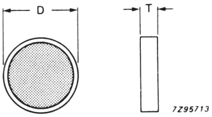
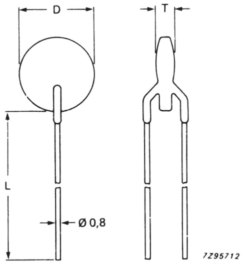
High power range

cat. number	R at 25°C Ω	max continuous power 0–55°C W	current at max power 25°C A	approx. dissipation factor mW/K	size
2322 644 90004	82	1.7	2.5	17	3A
2322 644 90005	15	2.2	3	17	3B
2322 644 90008	20	5	5	21	3C
2322 644 90013	20	6	5.5	21	3C
2322 644 90025	20	6	5.5	21	3D
2322 644 90011	14	4	*	*	4A
2322 644 90012	5	8	*	*	4B
2322 644 90016	2.5	8	3.6	14	5A
2322 644 90017	4	8	4	15	5B
2322 644 90018	5	7	4.1	15.5	5C
2322 644 90019	7	6	4.3	16	5D
2322 644 90021	10	3	2.7	12	5E
2322 644 90022	2	15	7.4	27	5F
2322 644 90023	2.5	12	7	28	5G

* depends upon mounting method (leadless disc)
leadless disc will be supplied upon request (2322 610 0....)

Surge current limiting range, dimensions

For detailed information on these and other types see Data Handbook C11

	key to dimensions in mm			
outline drawing	size	D	T	L
	3A	15 ± 0.5	3 ± 0.5	59 ± 3
	3B	15 ± 0.5	4 ± 1	59 ± 3
	3C	22.8 ± 1	4 ± 1	62 ± 2
	3D	22.8 ± 1	4 ± 1	60 ± 2
	4A	15.65*	3.75*	–
	4B	16 ± 0.5	3.75*	59 ± 3
	5A	13.5 max	4 app.	38 min
	5B	13.5 max	4.5 app.	38 min
	5C	13.5 max	5 app.	38 min
	5D	13.5 max	6 app.	38 min
	5E	10 max	4.5 app.	38 min
	5F	24 max	6.5 app.	38 min
	5G	24 max	7 app.	38 min

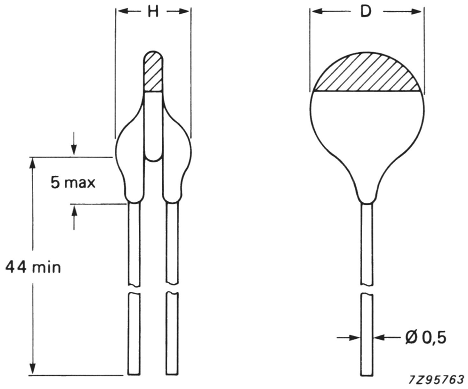
* ± 0.35

PTC THERMISTORS (DISC)

General data
2322 66. .....

For detailed information on these and other types see Data Handbook C11

Resistance at 25 °C	50 to 60 Ω
Switch temperature	+30 to +105 °C
Maximum voltage (d.c.)	25 V
Temperature coefficient	7 to 40%/K
Thermal time constant	18 to 20 s
Temperature range	−10 to +125 °C



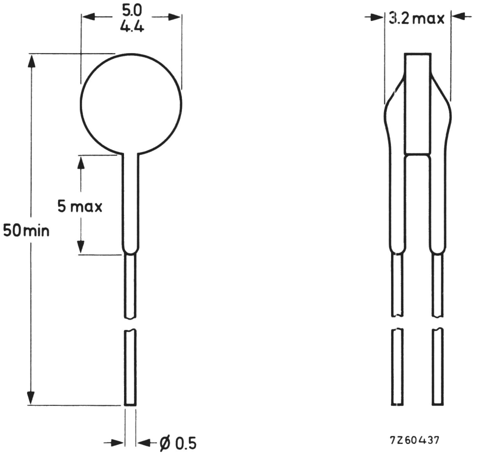
status = P

cat. number	resistance at 25 °C	resistance at 125 °C	switch temperature °C	temperature coefficient %/K	D max mm	H max mm
2322 660 91006	60 Ω	3 to 15 kΩ	30	7	6	4.5
2322 660 91007	50 Ω	100 to 500 kΩ	50	16	6	4.5
2322 660 91008	50 Ω	50 to 500 kΩ	80	23	6	4.5
2322 660 91009	50 Ω	0.1 to 1.2 MΩ	105	40	6	4.5

cat. number	resistance at temperature in °C				V_{max} V (d.c.)	D max mm	H max mm
2322 661 91002	R_{60}	< 100 Ω	R_{100}	> 1 kΩ	50	7.5	6
2322 661 91003	R_{95}	< 80 Ω	R_{130}	> 10 kΩ	50	7.5	6
2322 661 91004	R_{40}	< 90 Ω	R_{100}	> 10 kΩ	50	7.5	6
2322 661 91005	R_{100}	3–20 kΩ			40	7.5	5

For detailed information on these and other types see Data Handbook C11

Resistance at +25 °C	250 Ω ±25%
Switch temperature	+6 °C approx.
Maximum voltage at 55 °C	25 V d.c.
Temperature coefficient	+5%/K
Dissipation factor	6 mW/K approx.
Temperature range	0 to +55 °C



status = P

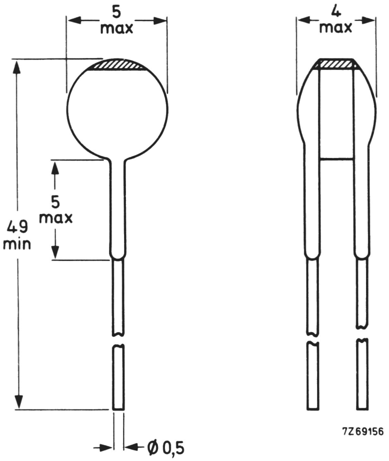
catalogue number

2322 660 91001

General data
2322 660 93001

For detailed information on these and other types see Data Handbook C11

Resistance at +25 °C	750 to 1500 Ω
Resistance at +175 °C and V_{pulse} = 345 V	70000 Ω
Switch temperature	115 °C
Temperature coefficient	+26%/K
Maximum voltage (r.m.s.)	245 V
Dissipation factor	7 mW/K
Operating temperature range	
at 0 power	−25 to +55°C
at maximum voltage	0 to +55°C



status = P

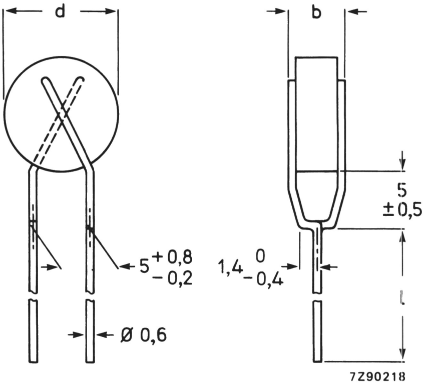
catalogue number

2322 660 93001

PTC THERMISTORS (overload protection)

For detailed information on these and other types see Data Handbook C11

Resistance at 25 °C	1,6 to 90 Ω
Switch temperature	approx. 120 °C
Maximum d.c. voltage	56 V
Trip current at 10 °C	112 to 1360 mA
Operating temperature range at V_{max}	0 to +55 °C



status = P

catalogue number	I_{nt} at 55 °C mA	I_t at 10 °C mA	R_{25} approx. Ω	I_{max} at 0 °C mA	$I_{res\ max}$ at 10 °C mA	R_s ±5% Ω	dissip. factor approx. mW/K	heat cap. approx. J/K	d mm	b max mm	l ±3 mm
2322 660 15691	56	112	90	460	30	56	6	0,08	4,5	4	20
2322 660 16891	68	136	60	600	30	51	6	0,08	4,5	4	20
2322 660 18291	82	164	42	750	30	43	6	0,08	4,5	4	20
2322 661 11011	100	200	32	950	35	36	7	0,15	6,5	4	20
2322 661 11211	120	240	22	1300	35	27	7	0,15	6,5	4	20
2322 661 11511	150	300	18	1600	40	22	7.5	0,16	8,0	4	20
2322 662 11811	180	360	12.5	2200	45	16	8	0,42	10,0	4,5	20
2322 662 12211	220	440	9	2900	50	13	9	0,55	12,0	4,5	20
2322 662 12711	270	540	6.5	4000	50	10	9	0,55	12,0	4,5	20
2322 663 13311	330	660	4.3	6300	60	5.6	10	0,83	13,0	5	20
2322 663 13911	390	780	3.8	7300	70	5.1	12	1,24	16,0	5	20
2322 663 14711	470	940	2.6	12000	70	2.7	12	1,24	16,0	5	20
2322 664 15611	560	1120	2.2	14000	100	2.4	16	2,34	20,0	6	16
2322 664 16811	680	1360	1.6	18000	100	2.0	16	2,34	20,0	6	16

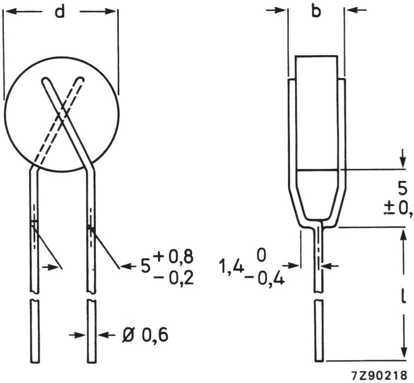
N.B. Series 2322 660/661/662 available on tape.
All series available without leads.

PTC THERMISTORS (overload protection)

General data
2322 66. 1...3

For detailed information on these and other types see Data Handbook C11

Resistance at 25 °C	3.5 to 1900 Ω
Switch temperature	approx. 120 °C
Maximum d.c. voltage	265 V
Trip current at 10 °C	24 to 940 mA
Operating temperature range at V_{max}	0 to +55 °C



status = P

catalogue number	I_{nt} at 55 °C mA	I_t at 10 °C mA	R_{25} approx. Ω	I_{max} at 0 °C mA	$I_{res\,max}$ at 10 °C mA	R_s ±5% Ω	dissip. factor approx. mW/K	heat cap. approx. J/K	d mm	b max mm	l ±3 mm
2322 660 11293	12	24	1900	110	5	1100	6	0,12	4,5	5	20
2322 660 11593	15	30	1200	135	5	1100	6	0,12	4,5	5	20
2322 660 11893	18	36	850	165	5	1000	6	0,12	4,5	5	20
2322 660 12293	22	44	560	200	6	910	6	0,12	4,5	5	20
2322 660 12793	27	54	380	250	6	820	6	0,12	4,5	5	20
2322 661 13393	33	66	280	290	7	750	7	0,22	6,5	5	20
2322 661 13993	39	78	200	350	7	620	7	0,22	6,5	5	20
2322 661 14793	47	94	140	420	7	560	7	0,22	6,5	5	20
2322 661 15693	56	112	100	500	8	470	7	0,22	6,5	5	20
2322 661 16893	68	136	72	600	8	390	8	0,33	8,0	5	20
2322 661 18293	82	164	50	730	9	330	8	0,33	8,0	5	20
2322 661 11013	100	200	33	900	9	270	8	0,33	8,0	5	20
2322 662 11213	120	240	26	1100	12	220	8.5	0,48	10,0	5	20
2322 662 11513	150	300	20	1300	12	200	9.5	0,68	12,0	5	20
2322 662 11813	180	360	14	1700	14	150	9.5	0,68	12,0	5	20
2322 663 12213	220	440	10	2100	16	120	10	0,85	13,0	5	20
2322 663 12713	270	540	8	2500	19	100	12	1,30	16,0	5	20
2322 664 13313	330	660	7	3000	25	82	16	2,40	20,0	6	16
2322 664 13913	390	780	5	3600	25	68	16	2,40	20,0	6	16
2322 664 14713	470	940	3.5	4300	25	56	16	2,40	20,0	6	16

N.B. 2322 660/661/662 available on tape.
All series available without leads.

For detailed information on these and other types see Data Handbook C11

Resistance at +25 °C	220 Ω to 9,9 kΩ
Switch temperature	40 to 245 °C
Nom. voltage	12, 24, 120, 240 V
Max. voltage r.m.s T_{amb} = 0 to +55°C	16, 30, 145, 265 V

status = P

switch temperature °C	nominal operating voltage V	**catalogue number**	dimensions (mm) rectangular ceramic* (length x width x thickness)	disc ceramic* (diameter x thickness)
60	24	**2322 662 91025**	–	12 x 1.2
90	12	**2322 660 91032**	–	5.5 x 1.1
115	240	**2322 680 93021**	33 x 7.2 x 1.7	–
115	240	**2322 680 93029**	7 x 7.2 x 1.7	–
120	12	**2322 680 93039**	9.5 x 7.2 x 1.7	–
120	240	**2322 680 93016**	5.5 x 7.2 x 1.7	–
120	240	**2322 680 93015**	7 x 7.2 x 1.7	–
120	240	**2322 680 93018**	9.5 x 7.2 x 1.7	–
140	240	**2322 662 93079**	–	9.8 x 2.2
145	240	**2322 680 93031**	7 x 7.2 x 1.7	–
145	240	**2322 680 93022**	33 x 7.2 x 1.7	–
160	240	**2322 662 93078**	–	9.8 x 2.2
160	240	**2322 662 93054**	–	10 x 2.7
170	120	**2322 680 93036**	7 x 7.2 x 1.7	–
170	120	**2322 680 93027**	33 x 7.2 x 1.7	–
170	240	**2322 680 93032**	7 x 7.2 x 1.7	–
170	240	**2322 680 93023**	33 x 7.2 x 1.7	–
175	12	**2322 664 91007**	–	20 x 12
200	240	**2322 680 93033**	7 x 7.2 x 1.7	–
200	240	**2322 680 93024**	33 x 7.2 x 1.7	–
215	240	**2322 680 93004**	16.7 x 7.2 x 5.5	–
220	240	**2322 680 93019**	14 x 7.2 x 1.7	–
230	240	**2322 680 93034**	7 x 7.2 x 1.7	–
230	240	**2322 680 93025**	33 x 7.2 x 1.7	–
240	120	**2322 680 93037**	7 x 7.2 x 1.7	–
240	120	**2322 680 93028**	33 x 7.2 x 1.7	–
240	240	**2322 680 93008**	20 x 6 x 5	–
245	240	**2322 680 93035**	7 x 7.2 x 1.7	–
245	240	**2322 680 93026**	33 x 7.2 x 1.7	–

* all rectangular ceramics can be used to build tabuler assembled elements

PTC CERAMIC THERMISTORS FOR DEGAUSSING

General data

2322 662 96.../663 96101

For detailed information on these and other types see Data Handbook C11

Max. voltage RMS	see table
Min. inrush current	see table
Max. residual current	see table
Resistance at 25°C	see table
Coil resistance	see table

status = P

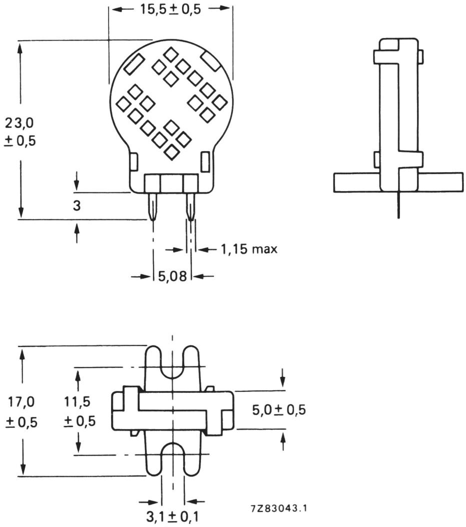
cat. number	type	V max RMS V	min inrush current (p–p) A	max residual current (p–p) mA	R_{25} Ω	R_{coil} Ω
2322 662 93701	mono	140	16	50	15	6.5
2322 662 93702	mono	290	25	45	18	8
2322 662 96176	mono	290	25	45	18	8
2322 662 96009	duo	265	10	4	36	17–25
2322 662 96011	duo	145/265	7.2/13	4	30	17
2322 662 96016	duo	265	12	6	25	25
2322 662 96022	duo	265	10	1	38	17–25
2322 662 96024	duo	265	10	2	36	25
2322 662 96025	duo	270	10	4	36	25
2322 662 96111	duo	265	13	4	30	17
2322 662 96116	duo	265	12	6	24	25
2322 662 96118	duo	265	10	2	36	25
2322 662 96121	duo	145/265	5.4/13	4/2.8	30	17
2322 662 96122	duo	145/270	6.6/14.4	10	25	12
2322 662 96123	duo	245	16.2	6	18	14
2322 662 96124	duo	270	20	15	20	10
2322 662 96125	duo	140	16	7	8	9
2322 662 96126	duo	270	20	15	18	13
2322 663 96101	duo	145	20	3	5	11

HUMIDITY SENSOR

General data
2322 691 90001

For detailed information on these and other types see Data Handbook C11

Humidity range	10 to 90% R.H.
Capacitance at +25 °C, 43% R.H. and 100 kHz	122 pF ± 15%
Sensitivity between 33 and 43% R.H.	0,4 ±0,05 pF/% R.H.
Frequency range	1 kHz to 1 MHz
Maximum a.c. or d.c. voltage	15 V
Storage humidity range	0 to 100% R.H.
Ambient temperature range	0 to +85 °C


15,5 ± 0,5
23,0
± 0,5
3
1,15 max
5,08
17,0
± 0,5
11,5
± 0,5
5,0 ± 0,5
3,1 ± 0,1
7Z83043.1

R

status = P

catalogue number

2322 691 90001

Resistors, CECC types

Products approved to the CECC (Cenelec Electronic Components Committee) harmonized system for electronic components of assessed quality

Resistors

type	CECC detail specification
SFR16T	CECC 40 101–001
SFR16T	CECC 40 101–041
SFR25	CECC 40 101–001
SFR25	CECC 40 101–002
SFR25	CECC 40 101–003
SFR25	CECC 40 101–019
SFR25H	CECC 40 101–041
MRS16T	CECC 40 101–001
MRS16T	CECC 40 101–002
MRS16T	CECC 40 101–009
MRS16T	CECC 40 101–019
MRS16T	CECC 40 101–042
MR25	CECC 40 101–001
MR25	CECC 40 101–002
MR25	CECC 40 101–008
MR25	CECC 40 101–009
MR25	CECC 40 101–019
MR25M	CECC 40 101–019
MRS25	CECC 40 101–002
MRS25	CECC 40 101–008
MRS25	CECC 40 101–009
MRS25	CECC 40 101–019
MRS25	CECC 40 101–042
MR30	CECC 40 101–002
MR30	CECC 40 101–008
MR30	CECC 40 101–009
MR52	CECC 40 101–002
MR52	CECC 40 101–008
2322 59. /60–460V	CECC 42 000 CECC 42 001

Materials and other products M

Data Handbook System

On most pages, directly underneath the title, reference is made to a 'Data Handbook'. That Handbook is part of the Philips Data Handbook System which is a comprehensive source of information on electronic components, subassemblies and materials. For this catalogue section the following Handbooks are of interest:

book	title
C3	Loudspeakers
C4	Ferroxcube potcores, square cores and cross cores
C5	Ferroxcube for power, audio/video and accelerators
C8	Variable mains transformers
C9	Piezoelectric quartz devices
C16	Permanent magnet materials
C19	Piezoelectric ceramics
C20	Wire–wound components for consumer and industry
T15	Dry reed switches

Contents

Data Handbook System M2

Contents M3

Variable mains transformers
- Application and features M4
- Survey M5
- Ganging and motor drive M8
- AC stabilizer module M9

Dry reed switches M10

Quartz crystal devices M12

Glass delay line M14

Loudspeakers
- Dome/cone tweeter M18
- Ribbon tweeter, dome/cone squawker M19
- Oval woofers M20
- Round woofers M21
- Speech reproduction M22
- Full range oval M23
- Full range round M30

Wire–wound components
- Recommended combinations for colour television M37
- Recommended combinations for colour DGD designs M41
- Recommended combinations for monochrome DGD designs M43

Soft ferrites
- Selection guide M47

Permanent magnet materials
- Shapes and applications M76
- General M77

Piezoelectric ceramics M79

CECC approved types (Ferrites) M84

Applications and features

For detailed information see Data Handbook C8

Applications

The main applications are:

- distortion–free voltage control for measuring equipment and voltage stabilizers;
- power control for electric heating, heat sealing of plastics;
- current control for galvanizing plants, electric marking pens:
- lighting control;

Types

Single variable transformers have an output current range from 0.5 to 32 A.
Most are auto–transformers; transformers with separate windings are available.
All auto–transformers are available as panel model and some also as bench model or laboratory model.
A panel model is a transformer of which the live parts are not protected (IP 00).
A bench model is a transformer in a protective housing and has a knob and dial (IP 20).
A laboratory model is a bench model with a handle, an input cable with plug and a fused outlet socket.
The transformers with separate windings are available as a panel model or a laboratory model. The laboratory model is a bench model with a handle, overload protection, a voltmeter for indicating the output voltage, a cable with plug for input connection, and an outlet socket.

Features

- continuous/stepless voltage control;
- small size and high efficiency by using high quality core material;
- very low stray losses and carefully treated track surface for low and stable contact resistance between brush and track resulting in low losses at the most critical place; under normal conditions, the brush track needs no maintenance;
- corrosion proof;
- long life carbon brushes;
- simple replacement of carbon brushes;
- adjustable sliding spindle;
- low winding resistance;
- high overload capability.

The majority of the transformers meet the safety requirements laid down in SEV1003; the relevant types have SEV approval, which is indicated on the transformer.
Variable mains transformers can be electrically connected in parallel, in series or in three phase circuits.
Chokes can be supplied to ensure correct current distribution for transformers connected in parallel.
For mechanical ganging of two or three variable transformers ganging units can be used, which are supplied either in an assembly kit or completely assembled including transformers.
Most transformers, either ganged or individual, can be provided with a remote–controlled motor drive.
Motor drive kits and base plate assemblies are available for this purpose. Alternatively, the units can be supplied completely assembled and tested.
Instructions for assembling come with all kits.
Replacement carbon brushes are available for all variable transformers.
For panel model transformers control knobs with dials are available, which can be locked in any position on the spindle by means of a clamping collet.

For detailed information see Data Handbook C8

- The given nominal input voltage may continuously be exceeded by 10%.
- The transformers may be used at frequencies between 50 and 400 Hz.
- The ambient temperature range is − 15 to + 40 °C for auto–transformers, and − 10 to + 40 °C for transformers with separate windings.
- The insulation resistance between live and non–live parts after the damp heat test (IEC 68–2–3, test Ca, 21 days) is > 5 MΩ.
- All auto–transformers are tested for 1 min at 2000 V, 50 Hz between live and non–live parts. The transformers with separate windings are tested for 1 min at 3500 V, 50 Hz (size code E2.1) or 5000 V, 50 Hz (size code E7.1).
- The air gap between live and non–live parts is ⩾ 4 mm.
- The leakage path between live and non–live parts is ⩾ 5 mm.
- The total angle of rotation is ≃ 320°.
- The guaranteed life of the carbon brushes, if used within the ratings, is 100000 two–way turns, however, the life expectancy is well beyond 250000 two–way turns.
- The climatic category, according to IEC68, is 15/040/21 for auto–transformers, and 10/040/21 for transformers with separate windings.

Survey
In the tables below the transformers are listed in order of their nominal input voltages, and for each input voltage in order of their output currents.
Note: In addition to the standard transformers listed in the tables, a variety of transformers made to customer's specification are available from running production, and further versions can be designed
upon request.

Status = C

Auto–transformers

1	2	3	4	5*	6*	7*	8	9	10	11
input voltage nom V	output current		output voltage no–load V	output current		ouput voltage no–load V	trans–former size code	catalogue number **2422 530 .....**		
	nom A	max A		nom A	max A			panel model	bench model	lab. model
32	7	8	0–32	–	–	–	E1.1	**90033**	–	–
42	2.5	3	0–42	–	–	–	E1.1	**90032**	–	–
	4	4.8	0–42	–	–	–	E2	**90031**	–	–
60	1.2	1.32	0–60	–	–	–	E1	**00007**	–	–
	3.15	3.7	0–60	–	–	–	E1.1	**10007**	–	–
110	0.6	0.7	0–110	–	–	–	E1	**00107**	–	–
	1.4	1.7	0–110	–	–	–	E1.1	**10107**	–	–
	10	–	0–130	–	–	–	E6	**90034**	–	–
115	1.2	11.4	0–130	1.32	1.54	0–115	E2	**01607**	–	–
	1.4	1.7	0–115	–	–	–	E2	**11607**	–	–
127	2.5	3	0–150	2.75	3.25	0–127	E3.1	**22307**	–	–
	5	6	0–150	5.5	6.5	0–127	E4	**23307**	–	–
	10	12.6	0–150	11	13	0–127	E6.1	**04307**	–	–

* The data given in the 5th, 6th and 7th columns hold for overwound transformers (transformers with a maximum output voltage higher than the input voltage) with the input voltage applied across the complete winding.

For detailed information see Data Handbook C8

Auto–transformers (continued)

1	2	3	4	5*	6*	7*	8	9	10	11
input voltage nom V	output current		output voltage no–load V	output current		ouput voltage no–load V	transformer size code	cat. number **2422 530 .....**		
	nom A	max A		nom A	max A			panel model	bench model	lab. model
220	0.5	0.6	0–220	–	–	–	E1.1	**10407**	–	–
	0.7	0.83	0–240	0.77	0.91	0–220	E2	**01407**	–	–
	0.83	1	0–220	–	–	–	E2	**11407**	–	–
	0.83	1	0–220	–	–	–	E2	**90037**	–	–
	1	1.25	0–260	1.1	1.3	0–220	E3.1	**22407**	**22411**	–
	1.2	1.4	0–260	1.32	1.56	0–220	E3	**08407**	–	–
	1.4	1.4	0–220	–	–	–	E3	**18407**	–	–
	2	2.4	0–260	2.2	2.6	0–220	E4	**03407**	–	–
	2.5	3	0–220	–	–	–	E4	**13407**	–	–
	2.5	3	0–260	2.75	3.25	0–220	E4	**23407**	**23411**	–
	4	4.8	90–220	–	–	–	E5	**90023**	–	–
	4	4.8	0–220	–	–	–	E5	**90024**	–	–
	4.5	5	0–253	5	5.85	0–220	E6	**90028**	–	–
	5	6	0–220	–	–	–	E6	**90027**	–	–
	5	6.3	0–260	5.5	6.5	0–220	E6.1	**04407**	**04411**	**04415**
	8.5	11.2	0–260	9.3	11.5	0–220	E7	**05407**	**05411**	**05415**
	10	12	0–220	–	–	–	E7	**15407**	–	–
	12	15	0–260	13.2	15.6	0–220	E8	**06407**	–	–
	15	18	0–220	–	–	–	E8	**16407**	–	–
	18	22	0–220	–	–	–	E8.1	**90067**	–	–
	23	30	0–260	25.3	30	0–220	E10	**07407**	**07411**	–
	32	36	0–240	–	–	–	E10	**17507**	–	–
240	0.5	0.55	120– 0	–	–	–	E1	**00407**	–	–
	0.5	0.55	120–240	–	–	–	E1	**00407**	–	–
	0.5	0.55	120– 0	–	–	–	E1	**90004**	–	–
	0.5	0.55	120–240	–	–	–	E1	**90004**	–	–
	0.5	0.55	0–120	–	–	–	E1	**90011**	–	–
	0.5	0.55	240–120	–	–	–	E1	**90011**	–	–
	1	1.25	0–270	1	1.25	0–240	E3.1	**22507**	**22511**	–
	1.7	2.1	0–240		–	–	E3.2	**90055**	–	–
	2	2.4	0–260	2	2.4	0–240	E4	**03507**	–	–
	2.5	3	0–270	2.5	3.2	0–240	E4	**23507**	–	–
	2.5	3	0–270	2.5	3.2	0–240	E4.1	–	**23511**	–
	2.9	3.5	0–240	–	–	–	E4.2	**90056**	–	–
	3.5	4.3	0–240	–	–	–	E5.2	**90057**	–	–
	4.5	5.5	0–240	–	–	–	E5.2	**90058**	–	–
	4.5	5	0–276	4.5	5	0–240	E6	**90028**	–	–
	5	6.3	0–270	5	6.3	0–240	E6.1	**04507**	**04511**	–
	6.3	7.7	0–240	–	–	–	E6.2	**90059**	–	–
	7.0	8.5	0–240	–	–	–	E6.3	**90061**	–	–

For detailed information see Data Handbook C8

Auto–transformers (continued)

1	2	3	4	5*	6*	7*	8	9	10	11
input voltage nom V	output current		output voltage no–load V	output current		ouput voltage no–load V	trans–former size code	cat. number **2422 530 .....**		
	nom A	max A		nom A	max A			panel model	bench model	lab. model
240	8.5	11.2	0–270	8.5	11,2	0–240	E7	**05507**	**05511**	–
	11	13.4	0–240	–	–	–	E7.3	**90062**	–	–
	12	14.6	0–240	–	–	–	E7.4	**90066**	–	–
	12	15	0–260	12	15	0–240	E8	**06507**	–	–
	15	18.3	0–240	–	–	–	E7.4	**90063**	–	–
	20	24.4	0–240	–	–	–	E10	**90064**	–	–
	23	30	0–260	23	30	0–240	E10	**07507**	**07511**	–
	26	31.7	0–240	–	–	–	E10	**90065**	–	–
	32	36	0–240	–	–	–	E10	**17507**	–	–
380	3.5	4.3	0–380	–	–	–	E6.3	**90075**	–	–
	4.0	4.9	0–380	–	–	–	E7	**90069**	–	–
	6.0	7.3	0–380	–	–	–	E8	**90071**	–	–
	8.0	9.8	0–380	–	–	–	E8.1	**90072**	–	–
	12.0	14.6	0–380	–	–	–	E10	**90073**	–	–

Transformers with separate windings

input voltage nom V	output current		output voltage no–load V	output current		ouput voltage no–load V	trans–former size code	cat. number **2422 529 .....**		
	nom A	max A		nom A	max A			panel model	bench model	lab. model
220	3	–	0–262	–	–	–	E7.1	**00008**	–	**00007**
	3	–	0–262	–	–	–	E7.1	–	–	**00017**
	3	–	0– 16	–	–	–	E2.1	**00009**	–	–
	6	–	0– 30	–	–	–	E5.3	**00011**	–	–

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* See note on page M5.

Ganging and motor drive

For detailed information see Data Handbook C8

Ganging and motor drive components

		parallel connection	mechanical ganging		motor drive									
						motor drive kit **4322 028 07...**								
		choke **2422 532**	ganging unit **2422 532**	spindle **4322**	base plate assembly **2422 532**	rotation time (s/rev)** at 50 Hz								
TSC	NOT	.....	.....	... .	.....	6.67	10	13.3	33.3	40	66.7	200	800
E2* E3* E3.1* E4* E4.1	1	–	–	–	**00073**	**301**	**311**	**321**	**331**	**341**	**351**	**361**	**371**
	2	ΔΔ	**00057**	**026 66750**	**00073**	**381**	**311**	**321**	**331**	**341**	**351**	**361**	**371**
	3	ΔΔ	**00053**	**026 66740**	**00073**	**381**	**391**	**321**	**331**	**341**	**351**	**361**	**371**
E3.1Δ E4Δ E4.1Δ	1	–	–	–	**00073**	**301**	**311**	**321**	**331**	**341**	**351**	**361**	**371**
	2	Δ	**00016**	**026 66750**	**00073**	**381**	**311**	**321**	**331**	**341**	**351**	**361**	**371**
	3	Δ	**00005**	**026 66740**	**00073**	**381**	**391**	**321**	**331**	**341**	**351**	**361**	**371**
E6	1	–	–	–	**00073**	**301**	**311**	**321**	**331**	**341**	**351**	**361**	**371**
	2	**00017**	**00055**	**026 66750**	–	**381**	**391**	**321**	**331**	**341**	**351**	**361**	**371**
	3	**2 x 00017**	**00056**	**026 66740**	–	**381**	**391**	**401**	**331**	**341**	**351**	**361**	**371**
E6.1 E7 E7.1	1	–	–	–	**00073**	**301**	**311**	**321**	**331**	**341**	**351**	**361**	**371**
	2	**00017**	**00055**	**026 08350**	–	**381**	**391**	**321**	**331**	**341**	**351**	**361**	**371**
	3	**2 x 00017**	**00056**	**026 08360**	–	**381**	**391**	**401**	**411**	**421**	**351**	**361**	**371**
E8	1	–	–	–	**00069**	**431**	**441**	**451**	**461**	**471**	**481**	**491**	**501**
	2	**00017**	**00066**	**026 08350**	–	**431**	**441**	**451**	**461**	**471**	**481**	**491**	**501**
	3	**2 x 00017**	**00067**	**026 08360**	–	–	**441**	**451**	**461**	**471**	**481**	**491**	**501**
						motor drive kit (cont.) **4322 028 07...**							
						20	30	40	100	120	200	600	2400
E10	1	–	–	–	**00062**	**511**	**521**	**531**	**541**	**551**	**561**	**571**	**581**
	2	**00017**	**00063**	**028 01850**	–	**511**	**521**	**531**	**541**	**551**	**561**	**571**	**581**
	3	**2 x 00017**	**00064**	**028 01860**	–	–	**521**	**531**	**541**	**551**	**561**	**571**	**581**

Note Motor drive kits with motors for other supply voltages, and gear boxes with other rotation times can be supplied to special order.

* Only panel models

Δ Only bench models

ΔΔ No standard chokes are available for transformer size codes E2, E3, E3.1, E4 and E4.1 since a single transformer of the standard range with larger size code, is a more economic proposition than ganging these smaller size transformers.

** The effective rotation angle of the variable mains transformers is 320°, so the actual rotation time between end stops is $^{320}/_{360}$ x listed rotation time.

AC stabilizer module

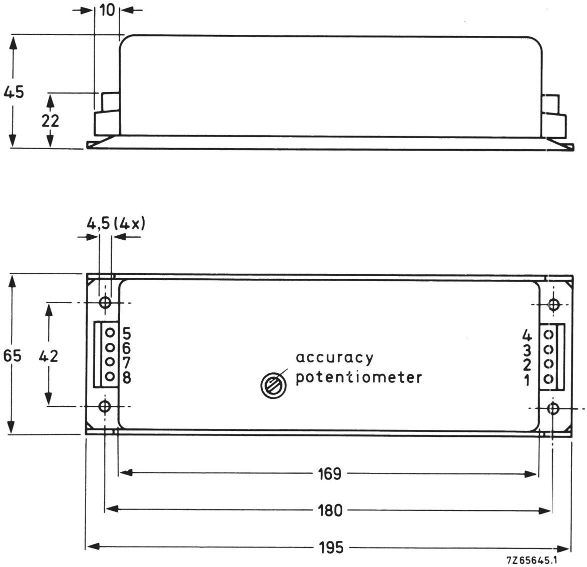
For detailed information see Data Handbook C8

Input voltage	220 V, +10%, −15%
Frequency range	50–60 Hz
Stabilized output voltage	
transformers 220 V/0–220 V	5 to 100% of input voltage
transformers 220 V/0–260 V	5 to 115% of input voltage
Maximum stabilization accuracy	±0,5 V
Ambient temperature range	−10 to +45 °C
catalogue number	**2422 532 00071**

This automatic stabilizer module can be used in combination with motor driven transformers for correction of voltage variations. Its main use will be in those applications where the speed of response is of secondary importance to waveform distortion, and where the price per kVA of controlled power must be kept low. Application areas are in test and research laboratories, service centres, and factories.
The module can also be used as a voltage, light or temperature–sensitive control for power sources.
It is not intended for transformers with separate windings.

A complete a.c. stabilizer circuit consists of:

- one or more mains transformers;
- a transformer ganging unit, if two or three transformers are used;
- a motor drive with 220 V reversible synchronous motor;
- the a.c. stabilizer module;
- a control potentiometer.



Dry reed switches

For detailed information on these and other types see Data Handbook T15

A dry reed switch is an assembly containing ferromagnetic contact blades, hermetically sealed in a glass envelope filled with an inert gas and operated by a magnetic field, externally generated by a coil or magnet. The following data is for Form–A dry reed switches only.

Features
- low resistance when closed and almost infinite resistance when open (complete galvanic seperation)
- reliable switch
- environmentally non–sensitive
- magnetic sensitive
- low operating power required

Application areas
- reed relays
- keyboards
- keyswitches
- automotive systems
- proximity switches
- security systems
- pace–makers
- games

Product survey	(all types are single–pole, single–throw with normally–open contacts. They all meet the requirements of IEC 255–9).
RI–23 series:	a general–purpose micro reed switch series for low and intermediate loads, designed to fit into a relay bobbin with a 0.1" internal diameter.
RI–25 series:	this micro reed switch series provides a high power capability (up to 25 W on the operate–AT range) in a compact package. Ideal for use in high load relays, this series also has an excellent switching performance at low voltages and currents.
RI–27 series:	very small 'pico' reed switches, ideal for use in DIP, SIP and SMDrelays. The hybrid contact layer, which ensures high reliability and long life, makes the RI–27 series suitable for other switching applications.
RI–29 series:	similar in size to the RI–27 series, the RI–29 series is specifically designed to switch higher currents, while still providing excellent switching performance at low voltages and currents.
RI–45:	reed switch for switching inductive loads driven by mains voltages up to 250 V. Breakdown voltage >750 V.
RI–46 series:	high–power reed switches capable of switching up to 40 W loads with breakdown voltages >1 kV DC, depending on the operate–AT value. Ideal for telephone applications and for driving solid state switches, as well as many high current applications that require a low contact resistance.

Dry reed switches

For detailed information on these and other types see Data Handbook T15

type series	RI–23	RI–25			RI–27	RI–29		RI–45	RI–46	
operate values (AT)[1]	8–70	8–16	14–32	28–70	10–34	16–25	20–34	27–59	15–28	24–70
release values (AT)[1]	4–32	4–14	7.5–22	12–32	4–19.5	5–18	7–19.5	8–21	5–16	8–22.5
contact resistance (MΩ) max typ	100 70	100 70	100 70	100 70	115 90	115 90	115 90	90 60	90 60	90 60
insulation resist. (Ω) min	10^{12}	10^{12}	10^{12}	10^{12}	10^{12}	10^{12}	10^{12}	10^{12}	10^{12}	10^{12}
switched power (W) max	10	8	15	25	10	15	20	40	30	40
switched voltage (V) DC max	200	200	200	200	200	200	200		200	200
(V) AC max	140	140	140	140	140	140	140	250	250	250
switched current (mA) max	500	750	1000	1000	500	1000	1000	1000	1000	1000
bounce time (μs) typ	150	150	150	150	150	150	150	150	150	150
wire diameter (mm) ∅2 max	0.60	0.60	0.60	0.60	0.50	0.50	0.50	0.65	0.65	0.65
glass diameter (mm) ∅1 max	2.54	2.54	2.54	2.54	1.8	1.8	1.8	2.8	2.8	2.8
glass length (mm)L max	15.0	15.0	15.0	15.0	13.5	13.5	13.5	21.5	21.5	21.5
total length (mm)T ±0.5	46	46	46	46	46	46	46	54.8	54.8	54.8

1) measured using a coil consisting of 5000 turns of 42 SWG solid enamelled copper wire wounding on a 8.75 mm former having a winding length of 25.4 mm.

Quartz crystal devices

For detailed information on these and other types see Data Handbook C9

Philips have strong technological and industrial capabilities in the field of quartz crystal devices. Three types of devices are generally available:

1) Standard crystals for frequency stabilization in the frequency range 4 MHz to 14 MHz.
2) Special crystals for industrial applications from 1 MHz up to 125 MHz.
3) Crystal oscillators.

Some types in the categories 2 and 3 are listed below.

mode of vibration	frequency range MHz	type	holder envelope	connections	basic catalogue number
fundamental	1 to 1.8	HC–6/U	solder sealed	pins	**4322 152**
	1.8 to 25	HC–27/U	all–glass	pins	**4322 154**
		HC–27 ext	all–glass	pins	**4322 154**
		HC–33/U	solder sealed	pins	**4322 149**
		RW–36	resistance welded	pins	**4322 149**
	3 to 10	RW–10	resistance welded	flying leads	**4322 148**
					4322 148
	3 to 20	RW–43	resistance welded	flying leads	**4322 143**
	4.5 to 25	HC–26/U	all–glass	flying leads	**4322 155**
		HC–29/U	all–glass	pins	**4322 155**
		RW–43	resistance welded	flying leads	**4322 156**
		RW–42	resistance welded	pins	**4322 156**
	8–20	RW–80	resistance welded	flying leads	**9922 5210**
third overtone	10 to 75	HC–27/U	all–glass	pins	**4322 159**
		RW–36	resistance welded	pins	**4322 162**
		HC–33/U	solder sealed	pins	**4322 162**
	17 to 75	RW–43	resistance welded	flying leads	**4322 161**
		RW–42	resistance welded	pins	**4322 161**
		RW–80	resistance welded	flying leads	**9922 5213**
	20 to 75	HC–26/U	all–glass	flying leads	**4322 160**
		HC–29/U	all–glass	pins	**4322 160**
fifth overtone	50 to 125	HC–27/U	all–glass	pins	**4322 165**
		HC–26/U	all–glass	flying leads	**4322 166**
		HC–29/U	all–glass	pins	**4322 166**
		RW–43	resistance welded	flying leads	**4322 167**
		RW–42	resistance welded	pins	**4322 167**
		RW–36	resistance welded	pins	**4322 168**
		HC–33/U	solder sealed	pins	**4322 168**
		RW–80	resistance welded	flying leads	**9922 5218**

Special types

fundamental	1 MHz	HC–6/U	solder sealed	pins	**4322 152 01241**
	21,48 MHz	RW–80	resistance welded	flying leads	**4322 145 00011**
third overtone	10 MHz high precision	HC–27/U	all–glass	pins	**4322 159 00001**

QUARTZ CRYSTAL DEVICES (cont.)

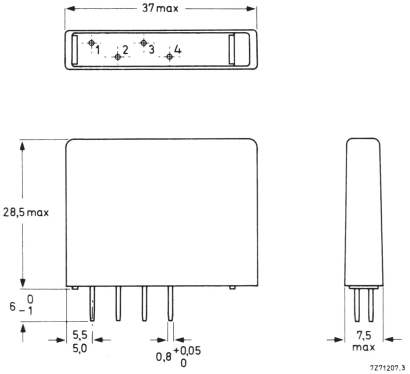
For detailed information on these and other types see Data Handbook C9

Quartz crystal controlled oscillators

frequency range MHz	temperature range °C	supply voltage ..V ±..	frequency tolerance ±..x 10^{-6}	adjustment facility	basic catalogue number
4.5 to 15	0 to +50	12 10%	1.0		**4322 190 2....**
	−10 to +60	12 10%	1.5	none	**4322 190 1....**
(TCXO)	−20 to +70	12 10%	2.0		**4322 190 0....**
4.5 to 15	0 to +50	12 10%	1.0	external	**4322 191 2....**
	−10 to +60	12 10%	1.5	variable	**4322 191 1....**
(TCXO)	−20 to +70	12 10%	2.0	capacitor	**4322 191 0....**
4.5 to 12	0 to +50	12 10%	1.0	external	**4322 192 2....**
	−10 to +60	12 10%	1.5	variable	**4322 192 1....**
(TCXO)	−20 to +70	12 10%	2.0	resistor	**4322 192 0....**
20 to 50	0 to +50	12 2%	1.0	external	**4322 195 0....**
	−20 to +70	12 2%	2.0	variable	**4322 195 1....**
(TCXO)	0 to +50	12 10%	2.0	capacitor	**4322 195 2....**
	−20 to +70	12 10%	3.0		**4322 195 3....**
4.5 to 15 (DTCXO)	−40 to +85	5 5%	0.5	external variable resistor	**4322 198 .....**
1.0 to 20 (CIO)	0 to +70	5 10%	100	none	**4322 199 .....**
8 to 15 (VCXO)	−5 to +60	5 5%	20	control voltage	**9922 515 6....**

Quartz crystals for temperature measurement

frequency range	**4 to 20 MHz**	**1 to 25 MHz**	basic catalogue number
temperature range	−100 to +150 °C	−100 to +300 °C	4322 146 .....
temperature coefficient	−40 to +80 x 10^{-6}/K	−50 to +85 x 10^{-6}/K	
linearity	< ± 2.5%	< ± 1.5%	
adjusting tolerance	< ± 150 x 10^{-6}	< ± 50 x 10^{-6}	
thermal time constant	typ. 10 s	3 to 30 s	
holder envelope	RW 43	RW43, RW80, HC–26/U HC–27/U, TO–39	



type	DL63	DL680	DL701	DL703	DL711
catalogue no.	**4322 027 84631**	**4322 027 84661**	**4322 027 84772**	**4322 027 84831**	**4322 027 84782**
application	CTV	VLP	CTV/VCR	VCR	CTV
system	PAL–Brazil	PAL	PAL–Europe	PAL–Europe	PAL/SECAM
nominal freq.	3.575611 MHz	7.500000 MHz	4.433619 MHz	4.433619 MHz	4.433619 MHz
−3 dB lower limit	2.8 MHz	5.5 MHz	3.43 MHz	3.03 MHz	3.43 MHz
−3 dB upper limit	4.5 MHz	8.5 MHz	5.23 MHz	5.43 MHz	5.23 MHz
insertion loss	9 ± 3 dB	max 17 dB	9 ± 3 dB	9 ± 3 dB	9 ± 3 dB
delay time	63486 ± 5 ns	64400 ± 50 ns	63943 ± 5 ns	63935 ± 5 ns	63943 ± 5 ns
nominal phase	0°	–	180°	180°	180°
drift (+10/+60°C)	typ 5 ns	⩽ 10 ns	⩽ 5 ns	⩽ 5 ns	⩽ 5 ns
spurious (3τ)	⩽ −22 dB	⩽ −20 dB	⩽ −33 dB	⩽ −28 dB	⩽ −33 dB*
spurious ('others')	⩽ −30 dB	⩽ −30 dB	⩽ −33 dB	⩽ −26 dB	⩽ −33 dB*
R1 (input)	560 Ω	150 Ω	390 Ω	390 Ω	390 Ω
R2 (output)	560 Ω	150 Ω	390 Ω	390 Ω	390 Ω
L1 eff. (input)	18 µH	2.2 µH	10 µH	18 µH	10 µH
L2 eff. (output)	18 µH	2.2 µH	10 µH	18 µH	10 µH

* Spurious signals measured in frequency range 3,9 to 4,75 MHz

type	DL720	DL721	DL722	DL750
catalogue number	**4322 027 84721**	**4322 027 84731**	**4322 027 84741**	**4322 027 84752**
application	CTV	CTV	CTV	CTV comb f./VCR
system	PAL–Argentina	PAL–Argentina	PAL–Argentina	NTSC
nominal frequency	3.582056 MHz	3.582056 MHz	3.582056 MHz	3.579545 MHz
−3 dB lower limit	2.8 MHz	2.8 MHz	2.8 MHz	2.8 MHz
−3 dB upper limit	4.5 MHz	4.5 MHz	4.5 MHz	4.5 MHz
insertion loss	9 ± 3 dB	9 ± 3 dB	9 ± 3 dB	9 ± 3 dB
delay time	63929 ± 5 ns	64069 ± 5 ns	64069 ± 5 ns	63555 ± 5 ns
nominal phase	0°	180°	180°	180°
drift (+10/+60°C)	⩽ 5 ns	⩽ 5 ns	⩽ 5 ns	typ 5 ns
spurious (3τ)	⩽ −22 dB	⩽ −22 dB	⩽ −22 dB	⩽ −22 dB
spurious ('others')	⩽ −28 dB	⩽ −28 dB	⩽ −28 dB	⩽ −28 dB
R1 (input)	560 Ω	560 Ω	390 Ω	560 Ω
R2 (output)	560 Ω	560 Ω	390 Ω	560 Ω
L1 eff. (input)	18 µH	18 µH	10 µH	18 µH
L2 eff. (output)	18 µH	18 µH	10 µH	18 µH

M

type	DL872	CF873	DL752	DL875	DL876
cat. number	**4322 027 84841**	**4322 027 84581**	**4322 027 84882**	**4322 027 84501**	**4322 027 84511**
application	VCR comb filter	VCR comb filter	VCR comb filter	VCR comb filter	VCR comb filter
system	PAL–Europe	PAL–Europe	NTSC	PAL–Brazil	PAL–Argentina
nominal frequency	4.433619 MHz (note 1)	4.433619 MHz (note 1)	3.579545 MHz (note 2)	3.575611 MHz (note 3)	3.582056 MHz (note 4)
−3 dB lower limit	3.93 MHz	3.93 MHz	3.08 MHz	3.08 MHz	3.08 MHz
−3 dB upper limit	4.93 MHz	4.93 MHz	4.08 MHz	4.08 MHz	4.08 MHz
insertion loss	18 ± 3 dB	18 ± 3 dB	10 ± 3 dB	18 ± 3 dB	18 ± 3 dB
delay time	128 µs	128 µs	64 µs	127 µs	128 µs
spurious (2τ)	$\leqslant -12$ dB	$\leqslant -18$ dB	$\leqslant -20$ dB	$\leqslant -15$ dB	$\leqslant -15$ dB
spurious (3τ)	–	–	$\leqslant -18$ dB	–	–
spurious ('others')	$\leqslant -23$ dB	$\leqslant -23$ dB	$\leqslant -26$ dB	$\leqslant -20$ dB	$\leqslant -20$ dB
comb depth at f_1	$\geqslant$ 20 dB	$\geqslant$ 20 dB	$\geqslant$ 24 dB	$\geqslant$ 18 dB	$\geqslant$ 18 dB
comb depth at f_+	$\geqslant$ 10 dB	$\geqslant$ 12 dB	$\geqslant$ 10 dB	$\geqslant$ 10 dB	$\geqslant$ 10 dB
comb depth at f_-	$\geqslant$ 10 dB	$\geqslant$ 12 dB	$\geqslant$ 10 dB	$\geqslant$ 10 dB	$\geqslant$ 10 dB

1) f_1 = 4.42971 MHz
f_+ = 4.92971 MHz
f_- = 3.92971 MHz

2) f_1 = 3.57168 MHz
f_+ = 3.06818 MHz
f_- = 4.07516 MHz

3) f_1 = 3.57168 MHz
f_+ = 4.06731 MHz
f_- = 3.07605 MHz

4) f_1 = 3.57815 MHz
f_+ = 4.07034 MHz
f_- = 3.08596 MHz

PHILIPS

type	CF752	CF881	CF882	CF883
cat. number	**4322 027 84522**	**4322 027 84521**	**4322 027 84541**	**4322 027 84561**
application	VCR comb filter	VCR comb filter	VCR comb filter	VCR comb filter
system	NTSC	PAL–Europe	PAL–Europe	PAL–Europe
nominal frequency	3.579545 MHz (note 2)	4.433619 MHz (note 1)	4.433619 MHz (note 1)	4.433619 MHz (note 1)
−3 dB lower limit	3.08 MHz	3.93 MHz	3.93 MHz	3.93 MHz
−3 dB upper limit	4.08 MHz	4.93 MHz	4.93 MHz	4.93 MHz
insertion loss	10 ± 3 dB	18 +4/−3 dB	18 +4/−3 dB	18 +4/−3 dB
delay time	64 µs	128 µs	128 µs	128 µs
spurious (2τ)	⩽ −20 dB	⩽ −20 dB	⩽ −20 dB	⩽ −20 dB
spurious (3τ)	⩽ −18 dB	–	–	–
spurious ('others')	⩽ −26 dB	⩽ −23 dB	⩽ −23 dB	⩽ −23 dB
comb depth at f_1	⩾ 24 dB	⩾ 20 dB	⩾ 20 dB	⩾ 20 dB
comb depth at f_+	⩾ 10 dB	⩾ 10 dB	⩾ 10 dB	⩾ 10 dB
comb depth at f_-	⩾ 10 dB	⩾ 10 dB	⩾ 10 dB	⩾ 10 dB

1) f_1 = 4.42971 MHz
f_+ = 4.92971 MHz
f_- = 3.92971 MHz

2) f_1 = 3.57168 MHz
f_+ = 3.06818 MHz
f_- = 4.07516 MHz

3) f_1 = 3.57168 MHz
f_+ = 4.06731 MHz
f_- = 3.07605 MHz

4) f_1 = 3.57815 MHz
f_+ = 4.07034 MHz
f_- = 3.08596 MHz

General data
Dome/cone tweeter

For detailed information on these and other types see Data Handbook C3

The loudspeakers are divided into groups as shown in the survey below. All loudspeakers are equipped with ceramic magnets unless otherwise indicated in the column 'core diameter'.

Dome tweeter loudspeakers

magnet/ core diam.	Extended type number	imp. Ω	res. freq. Hz	power handling capacity	dimensions flange width mm	dimensions flange length mm	dimensions mounting depth mm	cat. number
45/18	**AD 00845/T4**	4	1300	3		90	21	**2422 257 43803**
	AD 00845/T8	8	1300	3		90	21	**2422 257 43804**
53/25	**AD 11802/T8**	8	1100	4	96	96	37	**2422 257 43316**
60/18	**00 00401/T4**	4	950	4	95	95	25	**2404 257 43606**
60/25	**AD 0140/T4**	4	1200	4		94	16	**2422 257 33201**
	AD 0140/T8	8	1200	4		94	16	**2422 257 33202**
	AD 11400/T4	4	1500	4	82	82	24	**2422 257 43401**
	AD 11400/T8	8	1500	4	82	82	24	**2422 257 43402**
	AD 11401/T4	4	1050	6		98	23	**2422 257 43416**
	AD 11401/T8	8	1050	6		98	23	**2422 257 43417**
72/25	**00 11601/T4**	4	950	6	95	95	27	**2404 257 43506**
	AD 0162/T4	4	1000	4		94	24	**2422 257 33311**
	AD 0162/T8	8	1000	4		94	24	**2422 257 33312**
	AD 0163/T4	4	1300	4		94	24	**2422 257 33401**
	AD 0163/T8	8	1300	4		94	24	**2422 257 33402**
	AD 11600/T4	4	1300	4	96	96	30	**2422 257 43501**
	AD 11600/T8	8	1300	4	96	96	30	**2422 257 43502**
	AD 11610/T4	4	1300	4	96	96	30	**2422 257 43504**
	AD 11610/T8	8	1300	4	96	96	30	**2422 257 43505**
–/18 TC	**00 00960/T8**	8	1700	1		49	24	**2404 256 32404**
–/18 RE	**AD 00972/T4**	4	2100	1		35	11	**2404 256 32502**

Cone tweeter loudspeakers

frame size inches	magnet/ core diam.	Extended type number	imp. Ω	res. freq. Hz	power handling capacity	dimensions flange width mm	dimensions flange length mm	dimensions mounting depth mm	cat. number
2	36/12	**AD 20304/T4**	4	2200	3	–	55	21.3	**2422 257 32801**
		AD 20360/T4	4	2200	3	–	55	18.5	**2422 257 22101**
		AD 20360/T8	8	2200	3	–	55	18.5	**2422 257 22102**
		AD 20370/T4	4	2200	3	–	55	27	**2422 257 22201**
		AD 20370/T8	8	2200	3	–	55	27	**2422 257 22202**
		AD 22304/T4	4	2200	3	66	66	20.3	**2422 257 32811**
		AD 22304/T8	8	2200	3	66	66	20.3	**2422 257 32812**
		AD 22360/T4	4	2200	3	66	66	17.5	**2422 257 22111**
		AD 22360/T8	8	2200	3	66	66	17.5	**2422 257 22112**
		AD 22370/T4	4	2200	3	66	66	26	**2422 257 22211**
		AD 22370/T8	8	2200	3	66	66	26	**2422 257 22212**

RE = rare earth
TC = ticonal

Ribbon tweeter, dome/cone squawker

For detailed information of these and other types see Data Handbook C3

Ribbon tweeter loudspeakers

magnet/ core diam.	Extended type number	imp. Ω	res. freq. Hz	power handling capacity	dimensions flange width mm	dimensions flange length mm	dimensions mounting depth mm	cat. number
–/–	**AD 21600/RT8**	8		10	118	134	30	**2422 257 52002**

Dome squawker loudspeakers

magnet/ core diam.	Extended type number	imp. Ω	res. freq. Hz	power handling capacity	dimensions flange width mm	dimensions flange length mm	dimensions mounting depth mm	cat. number
102/50	**AD 02110/SQ4**	4	360	30	134	134	97	**2422 257 32201**
	AD 02110/SQ8	8	360	30	134	134	97	**2422 257 32202**

Cone squawker loudspeakers

frame size inches	magnet/ core diameter	Extended type number	imp. Ω	res. freq. Hz	power handling capacity	dimensions flange width mm	dimensions flange length mm	dimensions mounting depth mm	cat. number
14	36/14	**AD 33303/SQ8**	8	1050	5	97	97	28.5	**2422 257 53112**
25	72/25	**AD 50600/SQ4**	4	260	20	115	115	103.5	**2422 257 45001**
		AD 50600/SQ8	8	260	20	115	115	103.5	**2422 257 45002**

Oval woofers

For detailed information on these and other types see Data Handbook C3

Oval woofer loudspeakers

						dimensions			
frame size inches	magnet/ core diameter	Extended type number	imp. Ω	res. freq. Hz	power handling capacity	flange width mm	flange length mm	mounting depth mm	cat. number
3 x 6	45/18	**AD 36900/W4** **AD 36900/W8**	4 8	75 75	10 10	160 160	80 80	54 54	**2422 257 29005** **2422 257 29006**
3 x 6	53/18	**AD 36510/W4**	4	68	15	160	80	56	**2422 257 29001**
3 x 8	53/18	**AD 38510/W8A**	8	70	22	204	81.6	58	**2422 257 40902**

For detailed information on these and other types see Data Handbook C3

Round woofer loudspeakers

frame size inches	magnet/ core diameter	Extended type number	imp. Ω	res. freq. Hz	power handling capacity	dimensions			cat. number
						flange width mm	flange length mm	mounting depth mm	
4	45/18	**AD 44900/W4**	4	80	10	102	102	52.6	**2422 257 44205**
		AD 44900/W8	8	80	10	102	102	52.6	**2422 257 44206**
5.25	45/18	**AD 51900/W8M**	8	72	20	130	130	57.5	**2422 257 35918**
	53/18	**AD 51510/W4M**	4	72	20	130	130	60.6	**2422 257 35906**
7	53/18	**00 70802/W4**	4	90	30		166	58	**2404 257 27812**
		AD 70803/W8	8	65	28		166	58	**2422 257 27808**
		00 70805/W8	8	74	25		166	58	**2404 257 27904**
7	60/18	**00 70400/W8**	8	74	30		166	68.5	**2422 257 27202**
7	72/25	**AD 70604/W4**	4	48	40		166	60	**2422 257 47113**
		AD 70604/W8	8	48	40		166	60	**2422 257 47114**
7	90/25	**AD 70654/W4**	4	48	50		166	62	**2422 257 47215**
		AD 70654/W8	8	48	50		166	62	**2422 257 47216**
8	53/18	**00 80800/W4**	4	53	25		204	70	**2422 257 38805**
		00 80800/W8	8	53	25		204	70	**2422 257 38806**
8	60/18	**00 80400/W4**	4	52	25		204	73	**2422 257 28203**
8	72/25	**AD 80606/W8G**	8	38	50		204	81	**2422 257 48213**
		AD 80622/W4	4	42	50		204	81	**2422 257 48403**
		AD 80622/W8	8	42	50		204	81	**2422 257 48404**
		AD 80623/W4	4	46	60		204	81	**2422 257 48405**
		AD 80626/W4	4	42	60		204	81	**2422 257 48203**
		AD 80626/W8	8	42	60		204	81	**2422 257 48204**
		AD 80627/W4	4	46	65		204	81	**2422 257 48407**
8	90/25	**AD 80652/W4**	4	39	50		204	83	**2422 257 48511**
		AD 80652/W8	8	39	50		204	83	**2422 257 48512**
		00 80667/W4	4	42	70		204	83	**2404 257 48504**
		00 80667/W8	8	42	70		204	83	**2404 257 48505**
10	90/35	**AD 10672/W8**	8	27	60		261	100	**2422 257 31704**
10	121/50	**AD 10202/W8**	8	26	80		261	107	**2422 257 31807**
12	90/35	**AD 12672/W8**	8	26	60		311	106	**2422 257 31404**
12	121/50	**AD 12202/W8**	8	24	80		311	110	**2422 257 31508**
12	134/50	**AD 12252/W8**	8	27	100		311	112	**2422 257 61004**

Speech reproduction

For detailed information on these and other types see Data Handbook C3

Loudspeakers for speech reproduction

						dimensions			
frame size inches	magnet/ core diameter	Extended type number	imp. Ω	res. freq. Hz	power handling capacity	flange width mm	flange length mm	mounting depth mm	cat. number
1 1/3	–/14 RE	**AD 01980/Y8**	8	600	0.3		34	5	**2403 256 12503**
		AD 01980/Y15	15	600	0.3		34	5	**2403 256 12502**
		AD 01980/Y25	25	600	0.3		34	5	**2403 256 12501**
1 1/2	–/14 RE	**AD 01985/Y8**	8	600	0.3		38	5	**2403 256 12403**
		AD 01985/Y15	15	600	0.3		38	5	**2403 256 12402**
		AD 01985/Y25	25	600	0.3		38	5	**2403 256 12401**
1 1/2	26/10	**WD 01620/Y8**	8	430	0.3		38	14	**2403 255 00002**
		WD 01620/Y15	15	430	0.3		38	14	**2403 255 00003**
		WD 01620/Y25	25	430	0.3		38	14	**2403 255 00004**
		WD 01620/Y50	50	430	0.3		38	14	**2403 255 00005**
		WD 01621/Y8	8	430	0.3		38	14	**2403 255 20002**
		WD 01621/Y15	15	430	0.3		38	14	**2403 255 20003**
		WD 01621/Y25	25	430	0.3		38	14	**2403 255 20004**
		WD 01621/Y50	50	430	0.3		38	14	**2403 255 20005**
2	26/10	**WD 20620/Y8**	8	390	0.3		50	15.6	**2403 255 10002**
		WD 20620/Y15	15	390	0.3		50	15.6	**2403 255 10003**
		WD 20620/Y25	25	390	0.3		50	15.6	**2403 255 10004**
		WD 20620/Y50	50	390	0.3		50	15.6	**2403 255 10005**
		WD 20621/Y8	8	390	0.3		50	15.6	**2403 255 30001**
		WD 20621/Y15	15	390	0.3		50	15.6	**2403 255 30003**
		WD 20621/Y25	25	390	0.3		50	15.6	**2403 255 30004**
		WD 20621/Y50	50	390	0.3		50	15.6	**2403 255 30005**
2 1/2	28/10*	**AD 2071/Z4**	4	360	1		64	19.7	**2403 257 23801**
		AD 2071/Z8	8	360	1		64	19.7	**2403 257 23802**
		AD 2071/Z15	15	360	1		64	19.7	**2403 257 23803**
		AD 2071/Z25	25	360	1		64	19.7	**2403 257 23804**
		AD 2071/Z50	50	360	1		64	19.7	**2403 257 23806**
		AD 2071/Z110	110	360	1		64	19.7	**2403 257 23808**
		AD 2071/Z150	150	360	1		64	19.7	**2403 257 23805**
		AD 2071/Z300	300	360	1		64	19.7	**2403 257 23807**

RE = rare earth
* = square magnet

For detailed information on these and other types see Data Handbook C3

Full range oval loudspeakers

frame size inches	core diameter	Extended type number	imp. Ω	res. freq. Hz	power handling capacity	dimensions flange width mm	dimensions flange length mm	dimensions mounting depth mm	cat. number
2 x 3.5	36/12	**AD 24370/X15**	15	165	4	90	50	40	**2422 257 24415**
2 x 6	36/14	**AD 26320/X8**	8	155	5	160	57	40.5	**2422 257 29416**
		AD 26321/X15	15	190	3	160	57	40.5	**2422 257 29417**
		AD 26952/X8	8	155	5	160	57	44	**2422 257 29316**
		AD 26952/X15	15	155	5	160	57	44	**2422 257 29313**
		AD 26313/X8	8	155	5	160	57	42.6	**2422 257 29402**
3 x 5	28/10*	**WD 35720/X4**	4	160	3	75	130	35	**2403 251 50001**
		WD 35720/X8	8	160	3	75	130	35	**2403 251 50002**
		WD 35720/X15	15	160	3	75	130	35	**2403 251 50003**
		WD 35720/X25	25	160	3	75	130	35	**2403 251 50004**
		WD 35721/X4	4	160	3	75	130	35	**2403 251 51201**
		WD 35721/X8	8	160	3	75	130	35	**2403 251 51202**
		WD 35721/X15	15	160	3	75	130	35	**2403 251 51203**
		WD 35721/X25	25	160	3	75	130	35	**2403 251 51204**
		WD 35722/X4	4	160	3	75	130	35	**2403 251 50101**
		WD 35722/X8	8	160	3	75	130	35	**2403 251 50102**
		WD 35722/X15	15	160	3	75	130	35	**2403 251 50103**
		WD 35722/X25	25	160	3	75	130	35	**2403 251 50104**
		WD 35725/X4	4	160	5	75	130	35	**2403 251 50601**
		WD 35725/X8	8	160	5	75	130	35	**2403 251 50602**
		WD 35725/X15	15	160	5	75	130	35	**2403 251 50603**
		WD 35725/X25	25	160	5	75	130	35	**2403 251 50604**
		WD 35726/X4	4	160	5	75	130	35	**2403 251 51501**
		WD 35726/X8	8	160	5	75	130	35	**2403 251 51502**
		WD 35726/X15	15	160	5	75	130	35	**2403 251 51503**
		WD 35726/X25	25	160	5	75	130	35	**2403 251 51504**
		WD 35727/X4	4	160	5	75	130	35	**2403 251 50701**
		WD 35727/X8	8	160	5	75	130	35	**2403 251 50702**
		WD 35727/X15	15	160	5	75	130	35	**2403 251 50703**
		WD 35727/X25	25	160	5	75	130	35	**2403 251 50704**
		WD 35740/X4	4	160	2.5	75	130	49	**2403 251 50201**
		WD 35740/X8	8	160	2.5	75	130	49	**2403 251 50202**
		WD 35740/X15	15	160	2.5	75	130	49	**2403 251 50203**
		WD 35740/X25	25	160	2.5	75	130	49	**2403 251 50204**

* = square magnet

For detailed information on these and other types see Data Handbook C3

Full range oval loudspeakers (cont.)

						dimensions			
frame size inches	core diam.	Extended type number	imp. Ω	res. freq. Hz	power handling capacity	flange width mm	flange length mm	mounting depth mm	cat. number
3 x 5	28/10*	**WD 35741/X4**	4	160	2.5	75	130	49	**2403 251 51301**
		WD 35741/X8	8	160	2.5	75	130	49	**2403 251 51302**
		WD 35741/X15	15	160	2.5	75	130	49	**2403 251 51303**
		WD 35741/X25	25	160	2.5	75	130	49	**2403 251 51304**
		WD 35742/X4	4	160	2.5	75	130	49	**2403 251 50301**
		WD 35742/X8	8	160	2.5	75	130	49	**2403 251 50302**
		WD 35742/X15	15	160	2.5	75	130	49	**2403 251 50303**
		WD 35742/X25	25	160	2.5	75	130	49	**2403 251 50304**
		WD 35745/X4	4	160	3.5	75	130	49	**2403 251 50801**
		WD 35745/X8	8	160	3.5	75	130	49	**2403 251 50802**
		WD 35745/X15	15	160	3.5	75	130	49	**2403 251 50803**
		WD 35745/X25	25	160	3.5	75	130	49	**2403 251 50804**
		WD 35746/X4	4	160	3.5	75	130	49	**2403 251 51601**
		WD 35746/X8	8	160	3.5	75	130	49	**2403 251 51602**
		WD 35746/X15	15	160	3.5	75	130	49	**2403 251 51603**
		WD 35746/X25	25	160	3.5	75	130	49	**2403 251 51604**
		WD 35747/X4	4	160	3.5	75	130	49	**2403 251 50901**
		WD 35747/X8	8	160	3.5	75	130	49	**2403 251 50902**
		WD 35747/X15	15	160	3.5	75	130	49	**2403 251 50903**
		WD 35747/X25	25	160	3.5	75	130	49	**2403 251 50904**
		WD 35760/X4	4	160	2.5	75	130	49	**2403 251 50401**
		WD 35760/X8	8	160	2.5	75	130	49	**2403 251 50402**
		WD 35760/X15	15	160	2.5	75	130	49	**2403 251 50403**
		WD 35760/X25	25	160	2.5	75	130	49	**2403 251 50404**
		WD 35761/X4	4	160	2.5	75	130	49	**2403 251 51401**
		WD 35761/X8	8	160	2.5	75	130	49	**2403 251 51402**
		WD 35761/X15	15	160	2.5	75	130	49	**2403 251 51403**
		WD 35761/X25	25	160	2.5	75	130	49	**2403 251 51404**
		WD 35762/X4	4	160	2.5	75	130	49	**2403 251 50501**
		WD 35762/X8	8	160	2.5	75	130	49	**2403 251 50502**
		WD 35762/X15	15	160	2.5	75	130	49	**2403 251 50503**
		WD 35762/X25	25	160	2.5	75	130	49	**2403 251 50504**
		WD 35765/X4	4	160	3.5	75	130	49	**2403 251 51001**
		WD 35765/X8	8	160	3.5	75	130	49	**2403 251 51002**
		WD 35765/X15	15	160	3.5	75	130	49	**2403 251 51003**
		WD 35765/X25	25	160	3.5	75	130	49	**2403 251 51004**
		WD 35766/X4	4	160	3.5	75	130	49	**2403 251 51701**
		WD 35766/X8	8	160	3.5	75	130	49	**2403 251 51702**
		WD 35766/X15	15	160	3.5	75	130	49	**2403 251 51703**
		WD 35766/X25	25	160	3.5	75	130	49	**2403 251 51704**
		WD 35767/X4	4	160	3.5	75	130	49	**2403 251 51101**
		WD 35767/X8	8	160	3.5	75	130	49	**2403 251 51102**
		WD 35767/X15	15	160	3.5	75	130	49	**2403 251 51103**
		WD 35767/X25	25	160	3.5	75	130	49	**2403 251 51104**
3 x 5	36/14	**AD 35951/X15A**	15	180	5	129	74	44.5	**2422 257 24905**
3 x 5	45/14	**AD 35850/X4**	4	190	3	129	74	37.3	**2422 257 24407**

* = square magnet

For detailed information on these and other types see Data Handbook C3

Full range oval loudspeakers (cont.)

frame size inches	core diam.	Extended type number	imp. Ω	res. freq. Hz	power handling capacity	dimensions			cat. number
						flange width mm	flange length mm	mounting depth mm	
3 x 6	28/10*	**WD 36720/X4**	4	130	3	80	160	44	**2403 251 60001**
		WD 36720/X8	8	130	3	80	160	44	**2403 251 60002**
		WD 36720/X15	15	130	3	80	160	44	**2403 251 60003**
		WD 36720/X25	25	130	3	80	160	44	**2403 251 60004**
		WD 36722/X4	4	130	3	80	160	44	**2403 251 60101**
		WD 36722/X8	8	130	3	80	160	44	**2403 251 60102**
		WD 36722/X15	15	130	3	80	160	44	**2403 251 60103**
		WD 36722/X25	25	130	3	80	160	44	**2403 251 60104**
		WD 36725/X4	4	130	5	80	160	44	**2403 251 60601**
		WD 36725/X8	8	130	5	80	160	44	**2403 251 60602**
		WD 36725/X15	15	130	5	80	160	44	**2403 251 60603**
		WD 36725/X25	25	130	5	80	160	44	**2403 251 60604**
		WD 36727/X4	4	130	5	80	160	44	**2403 251 60701**
		WD 36727/X8	8	130	5	80	160	44	**2403 251 60702**
		WD 36727/X15	15	130	5	80	160	44	**2403 251 60703**
		WD 36727/X25	25	130	5	80	160	44	**2403 251 60704**
		WD 36740/X4	4	130	2.5	80	160	57	**2403 251 60201**
		WD 36740/X8	8	130	2.5	80	160	57	**2403 251 60202**
		WD 36740/X15	15	130	2.5	80	160	57	**2403 251 60203**
		WD 36740/X25	25	130	2.5	80	160	57	**2403 251 60204**
		WD 36742/X4	4	130	2.5	80	160	57	**2403 251 60301**
		WD 36742/X8	8	130	2.5	80	160	57	**2403 251 60302**
		WD 36742/X15	15	130	2.5	80	160	57	**2403 251 60303**
		WD 36742/X25	25	130	2.5	80	160	57	**2403 251 60304**
		WD 36745/X4	4	130	3.5	80	160	57	**2403 251 60801**
		WD 36745/X8	8	130	3.5	80	160	57	**2403 251 60802**
		WD 36745/X15	15	130	3.5	80	160	57	**2403 251 60803**
		WD 36745/X25	25	130	3.5	80	160	57	**2403 251 60804**
		WD 36747/X4	4	130	3.5	80	160	57	**2403 251 60901**
		WD 36747/X8	8	130	3.5	80	160	57	**2403 251 60902**
		WD 36747/X15	15	130	3.5	80	160	57	**2403 251 60903**
		WD 36747/X25	25	130	3.5	80	160	57	**2403 251 60904**
		WD 36760/X4	4	130	2.5	80	160	57	**2403 251 60401**
		WD 36760/X8	8	130	2.5	80	160	57	**2403 251 60402**
		WD 36760/X15	15	130	2.5	80	160	57	**2403 251 60403**
		WD 36760/X25	25	130	2.5	80	160	57	**2403 251 60404**
		WD 36762/X4	4	130	2.5	80	160	57	**2403 251 60501**
		WD 36762/X8	8	130	2.5	80	160	57	**2403 251 60502**
		WD 36762/X15	15	130	2.5	80	160	57	**2403 251 60503**
		WD 36762/X25	25	130	2.5	80	160	57	**2403 251 60504**
		WD 36765/X4	4	130	3.5	80	160	57	**2403 251 61001**
		WD 36765/X8	8	130	3.5	80	160	57	**2403 251 61002**
		WD 36765/X15	15	130	3.5	80	160	57	**2403 251 61003**
		WD 36765/X25	25	130	3.5	80	160	57	**2403 251 61004**
		WD 36767/X4	4	130	3.5	80	160	57	**2403 251 61101**
		WD 36767/X8	8	130	3.5	80	160	57	**2403 251 61102**
		WD 36767/X15	15	130	3.5	80	160	57	**2403 251 61103**
		WD 36767/X25	25	130	3.5	80	160	57	**2403 251 61104**

* = square magnet

For detailed information on these and other types see Data Handbook C3

Full range oval loudspeakers (cont.)

frame size inches	core diam.	Extended type number	imp. Ω	res. freq. Hz	power handling capacity	dimensions			cat. number
						flange width mm	flange length mm	mounting depth mm	
3 x 6	36/14	**AD 36950/X8S**	8	95	10	80	160	56.4	**2422 257 29906**
3 x 6	45/ 14	**WD 36925/X4**	4	130	6	80	160	48.8	**2403 253 60601**
		WD 36925/X8	8	130	6	80	160	48.8	**2403 253 60602**
		WD 36925/X15	15	130	6	80	160	48.8	**2403 253 60603**
		WD 36925/X25	25	130	6	80	160	48.8	**2403 253 60604**
		WD 36927/X4	4	130	6	80	160	48.8	**2403 253 60701**
		WD 36927/X8	8	130	6	80	160	48.8	**2403 253 60702**
		WD 36927/X15	15	130	6	80	160	48.8	**2403 253 60703**
		WD 36927/X25	25	130	6	80	160	48.8	**2403 253 60704**
		WD 36945/X4	4	130	6	80	160	61.8	**2403 253 60801**
		WD 36945/X8	8	130	6	80	160	61.8	**2403 253 60802**
		WD 36945/X15	15	130	6	80	160	61.8	**2403 253 60803**
		WD 36945/X25	25	130	6	80	160	61.8	**2403 253 60804**
		WD 36947/X4	4	130	6	80	160	61.8	**2403 253 60901**
		WD 36947/X8	8	130	6	80	160	61.8	**2403 253 60902**
		WD 36947/X15	15	130	6	80	160	61.8	**2403 253 60903**
		WD 36947/X25	25	130	6	80	160	61.8	**2403 253 60904**
		WD 36965/X4	4	130	6	80	160	61.8	**2403 253 61001**
		WD 36965/X8	8	130	6	80	160	61.8	**2403 253 61002**
		WD 36965/X15	15	130	6	80	160	61.8	**2403 253 61003**
		WD 36965/X25	25	130	6	80	160	61.8	**2403 253 61004**
		WD 36967/X4	4	130	6	80	160	61.8	**2403 253 61101**
		WD 36967/X8	8	130	6	80	160	61.8	**2403 253 61102**
		WD 36967/X15	15	130	6	80	160	61.8	**2403 253 61103**
		WD 36967/X25	25	130	6	80	160	61.8	**2403 253 61104**
3 x 6	45/18	**AD 36901/X8**	8	95	8	160	80	54	**2422 257 29202**
		AD 36901/X15	15	95	8	160	80	54	**2422 257 29203**
3 x 6	60/18	**00 36400/X4K**	4	100	15	160	80	46	**2404 257 29701**
3.5 x 6	45/18	**AD 46902/X4SA**	4	95	10	154	94.5	54	**2422 257 20612**
		AD 46905/X4SA	4	130	7	154	94.2	54	**2422 257 20601**
3.5 x 6	60/18	**AD 46420/X4**	4	120	8	154	94.2	44	**2422 257 20213**
3 x 8	36/14	**AD 38950/X15**	15	120	10	204.6	82	53.3	**2422 257 40813**
3 x 8	45/18	**AD 38903/X8**	8	95	8	204.6	82	56	**2422 257 40402**

For detailed information on these and other types see Data Handbook C3

Full range oval loudspeakers (cont.)

frame size inches	core diam.	Extended type number	imp. Ω	res. freq. Hz	power handling capacity	dimensions			cat. number
						flange width mm	flange length mm	mounting depth mm	
4 x 6	28/10*	**WD 46720/X4**	4	130	3	102	154	44	**2403 251 80001**
		WD 46720/X8	8	130	3	102	154	44	**2403 251 80002**
		WD 46720/X15	15	130	3	102	154	44	**2403 251 80003**
		WD 46720/X25	25	130	3	102	154	44	**2403 251 80004**
		WD 46721/X4	4	130	3	102	154	44	**2403 251 81201**
		WD 46721/X8	8	130	3	102	154	44	**2403 251 81202**
		WD 46721/X15	15	130	3	102	154	44	**2403 251 81203**
		WD 46721/X25	25	130	3	102	154	44	**2403 251 81204**
		WD 46722/X4	4	130	3	102	154	44	**2403 251 80101**
		WD 46722/X8	8	130	3	102	154	44	**2403 251 80102**
		WD 46722/X15	15	130	3	102	154	44	**2403 251 80103**
		WD 46722/X25	25	130	3	102	154	44	**2403 251 80104**
		WD 46725/X4	4	130	5	102	154	44	**2403 251 80601**
		WD 46725/X8	8	130	5	102	154	44	**2403 251 80602**
		WD 46725/X15	15	130	5	102	154	44	**2403 251 80603**
		WD 46725/X25	25	130	5	102	154	44	**2403 251 80604**
		WD 46726/X4	4	130	5	102	154	44	**2403 251 81501**
		WD 46726/X8	8	130	5	102	154	44	**2403 251 81502**
		WD 46726/X15	15	130	5	102	154	44	**2403 251 81503**
		WD 46726/X25	25	130	5	102	154	44	**2403 251 81504**
		WD 46727/X4	4	130	5	102	154	44	**2403 251 80701**
		WD 46727/X8	8	130	5	102	154	44	**2403 251 80702**
		WD 46727/X15	15	130	5	102	154	44	**2403 251 80703**
		WD 46727/X25	25	130	5	102	154	44	**2403 251 80704**
		WD 46740/X4	4	130	2.5	102	154	57	**2403 251 80201**
		WD 46740/X8	8	130	2.5	102	154	57	**2403 251 80202**
		WD 46740/X15	15	130	2.5	102	154	57	**2403 251 80203**
		WD 46740/X25	25	130	2.5	102	154	57	**2403 251 80204**
		WD 46741/X4	4	130	2.5	102	154	57	**2403 251 81301**
		WD 46741/X8	8	130	2.5	102	154	57	**2403 251 81302**
		WD 46741/X15	15	130	2.5	102	154	57	**2403 251 81303**
		WD 46741/X25	25	130	2.5	102	154	57	**2403 251 81304**
		WD 46742/X4	4	130	2.5	102	154	57	**2403 251 80301**
		WD 46742/X8	8	130	2.5	102	154	57	**2403 251 80302**
		WD 46742/X15	15	130	2.5	102	154	57	**2403 251 80303**
		WD 46742/X25	25	130	2.5	102	154	57	**2403 251 80304**
		WD 46745/X4	4	130	3.5	102	154	57	**2403 251 80801**
		WD 46745/X8	8	130	3.5	102	154	57	**2403 251 80802**
		WD 46745/X15	15	130	3.5	102	154	57	**2403 251 80803**
		WD 46745/X25	25	130	3.5	102	154	57	**2403 251 80804**
		WD 46746/X4	4	130	3.5	102	154	57	**2403 251 81601**
		WD 46746/X8	8	130	3.5	102	154	57	**2403 251 81602**
		WD 46746/X15	15	130	3.5	102	154	57	**2403 251 81603**
		WD 46746/X25	25	130	3.5	102	154	57	**2403 251 81604**
		WD 46747/X4	4	130	3.5	102	154	57	**2403 251 80901**
		WD 46747/X8	8	130	3.5	102	154	57	**2403 251 80902**
		WD 46747/X15	15	130	3.5	102	154	57	**2403 251 80903**
		WD 46747/X25	25	130	3.5	102	154	57	**2403 251 80904**

* = sqaure magnet

Full range oval (cont.)

For detailed information on these and other types see Data Handbook C3

Full range oval loudspeakers (cont.)

frame size inches	core diam.	Extended type number	imp. Ω	res. freq. Hz	power handling capacity	dimensions			cat. number
						flange width mm	flange length mm	mounting depth mm	
4 x 6	28/10*	**WD 46760/X4**	4	130	2.5	102	154	57	**2403 251 80401**
		WD 46760/X8	8	130	2.5	102	154	57	**2403 251 80402**
		WD 46760/X15	15	130	2.5	102	154	57	**2403 251 80403**
		WD 46760/X25	25	130	2.5	102	154	57	**2403 251 80404**
		WD 46761/X4	4	130	2.5	102	154	57	**2403 251 81401**
		WD 46761/X8	8	130	2.5	102	154	57	**2403 251 81402**
		WD 46761/X15	15	130	2.5	102	154	57	**2403 251 81403**
		WD 46761/X25	25	130	2.5	102	154	57	**2403 251 81404**
		WD 46762/X4	4	130	2.5	102	154	57	**2403 251 80501**
		WD 46762/X8	8	130	2.5	102	154	57	**2403 251 80502**
		WD 46762/X15	15	130	2.5	102	154	57	**2403 251 80503**
		WD 46762/X25	25	130	2.5	102	154	57	**2403 251 80504**
		WD 46765/X4	4	130	3.5	102	154	57	**2403 251 81001**
		WD 46765/X8	8	130	3.5	102	154	57	**2403 251 81002**
		WD 46765/X15	15	130	3.5	102	154	57	**2403 251 81003**
		WD 46765/X25	25	130	3.5	102	154	57	**2403 251 81004**
		WD 46766/X4	4	130	3.5	102	154	57	**2403 251 81701**
		WD 46766/X8	8	130	3.5	102	154	57	**2403 251 81702**
		WD 46766/X15	15	130	3.5	102	154	57	**2403 251 81703**
		WD 46766/X25	25	130	3.5	102	154	57	**2403 251 81704**
		WD 46767/X4	4	130	3.5	102	154	57	**2403 251 81101**
		WD 46767/X8	8	130	3.5	102	154	57	**2403 251 81102**
		WD 46767/X15	15	130	3.5	102	154	57	**2403 251 81103**
		WD 46767/X25	25	130	3.5	102	154	57	**2403 251 81104**

* = square magnet

For detailed information on these and other types see Data Handbook C3

Full range oval loudspeakers (cont.)

						dimensions			
frame size inches	core diam.	Extended type number	imp. Ω	res. freq. Hz	power handling capacity	flange width mm	flange length mm	mounting depth mm	cat. number
4 x 6	45/14	**WD 46925/X4**	4	130	7	102	154	48.8	**2403 253 80601**
		WD 46925/X8	8	130	7	102	154	48.8	**2403 253 80602**
		WD 46925/X15	15	130	7	102	154	48.8	**2403 253 80603**
		WD 46925/X25	25	130	7	102	154	48.8	**2403 253 80604**
		WD 46926/X4	4	130	7	102	154	48.8	**2403 253 81501**
		WD 46926/X8	8	130	7	102	154	48.8	**2403 253 81502**
		WD 46926/X15	15	130	7	102	154	48.8	**2403 253 81503**
		WD 46926/X25	25	130	7	102	154	48.8	**2403 253 81504**
		WD 46927/X4	4	130	7	102	154	48.8	**2403 253 80701**
		WD 46927/X8	8	130	7	102	154	48.8	**2403 253 80702**
		WD 46927/X15	15	130	7	102	154	48.8	**2403 253 80703**
		WD 46927/X25	25	130	7	102	154	48.8	**2403 253 80704**
		WD 46945/X4	4	130	7	102	154	60.3	**2403 253 80801**
		WD 46945/X8	8	130	7	102	154	60.3	**2403 253 80802**
		WD 46945/X15	15	130	7	102	154	60.3	**2403 253 80803**
		WD 46945/X25	25	130	7	102	154	60.3	**2403 253 80804**
		WD 46946/X4	4	130	7	102	154	60.3	**2403 253 81601**
		WD 46946/X8	8	130	7	102	154	60.3	**2403 253 81602**
		WD 46946/X15	15	130	7	102	154	60.3	**2403 253 81603**
		WD 46946/X25	25	130	7	102	154	60.3	**2403 253 81604**
		WD 46947/X4	4	130	7	102	154	60.3	**2403 253 80901**
		WD 46947/X8	8	130	7	102	154	60.3	**2403 253 80902**
		WD 46947/X15	15	130	7	102	154	60.3	**2403 253 80903**
		WD 46947/X25	25	130	7	102	154	60.3	**2403 253 80904**
		WD 46965/X4	4	130	7	102	154	60.3	**2403 253 81001**
		WD 46965/X8	8	130	7	102	154	60.3	**2403 253 81002**
		WD 46965/X15	15	130	7	102	154	60.3	**2403 253 81003**
		WD 46965/X25	25	130	7	102	154	60.3	**2403 253 81004**
		WD 46966/X4	4	130	7	102	154	60.3	**2403 253 81701**
		WD 46966/X8	8	130	7	102	154	60.3	**2403 253 81702**
		WD 46966/X15	15	130	7	102	154	60.3	**2403 253 81703**
		WD 46966/X25	25	130	7	102	154	60.3	**2403 253 81704**
		WD 46967/X4	4	130	7	102	154	60.3	**2403 253 81101**
		WD 46967/X8	8	130	7	102	154	60.3	**2403 253 81102**
		WD 46967/X15	15	130	7	102	154	60.3	**2403 253 81103**
		WD 46967/X25	25	130	7	102	154	60.3	**2403 253 81104**

For detailed information on these and other types see Data Handbook C3

Full range round loudspeakers

frame size inches	core diam.	Extended type number	imp. Ω	res. freq. Hz	power handling capacity	dimensions			cat. number
						flange width mm	flange length mm	mounting depth mm	
3	28/10*	**AD 3071/Y4**	4	250	2		81	23	**2403 257 23601**
		AD 3071/Y8	8	250	2		81	23	**2403 257 23602**
		AD 3071/Y15	15	250	2		81	23	**2403 257 23603**
		AD 3071/Y25	25	250	2		81	23	**2403 257 23604**
		AD 3071/Y50	50	250	2		81	23	**2403 257 23605**
		AD 3371/Y4	4	250	2	81	81	23	**2403 257 23501**
		AD 3371/Y8	8	250	2	81	81	23	**2403 257 23502**
		AD 3371/Y15	15	250	2	81	81	23	**2403 257 23503**
		AD 3371/Y25	25	250	2	81	81	23	**2403 257 23504**
		AD 3371/Y50	50	250	2	81	81	23	**2403 257 23505**
		AD 3074/Y4	4	250	2		81	35	**2403 257 23201**
		AD 3074/Y8	8	250	2		81	35	**2403 257 23202**
		AD 3074/Y15	15	250	2		81	35	**2403 257 23203**
		AD 3074/Y25	25	250	2		81	35	**2403 257 23204**
		AD 3374/Y4	4	250	2	81	81	35	**2403 257 23301**
		AD 3374/Y8	8	250	2	81	81	35	**2403 257 23302**
		AD 3374/Y15	15	250	2	81	81	35	**2403 257 23303**
		AD 3374/Y25	25	250	2	81	81	35	**2403 257 23304**
		AD 30743/Y4	4	250	2		81	35	**2403 257 23701**
		AD 30743/Y8	8	250	2		81	35	**2403 257 23702**
		AD 30743/Y15	15	250	2		81	35	**2403 257 23703**
		AD 30743/Y25	25	250	2		81	35	**2403 257 23704**
		AD 33743/Y4	4	250	2	81	81	35	**2403 257 23901**
		AD 33743/Y8	8	250	2	81	81	35	**2403 257 23902**
		AD 33743/Y15	15	250	2	81	81	35	**2403 257 23903**
		AD 33743/Y25	25	250	2	81	81	35	**2403 257 23904**
3	45/18	**AD 33910/X8SA**	8	115	8	87.2	87.2	44.3	**2422 257 34512**
3	53/18	**00 3080/X4S**	4	120	10		87.2	33.2	**2404 257 34518**
4	28/10*	**AD 4072/X4**	4	170	3		105	30.2	**2403 257 24205**
		AD 4072/X8	8	170	3		105	30.2	**2403 257 24206**
		AD 4072/X15	15	170	3		105	30.2	**2403 257 24207**
		AD 4072/X25	25	170	3		105	30.2	**2403 257 24208**
		AD 4472/X4	4	170	3	105	105	30.2	**2403 257 24805**
		AD 4472/X8	8	170	3	105	105	30.2	**2403 257 24806**
		AD 4472/X15	15	170	3	105	105	30.2	**2403 257 24807**
		AD 4472/X25	25	170	3	105	105	30.2	**2403 257 24808**
		AD 40725/X4	4	170	5		105	30.2	**2403 257 54205**
		AD 40725/X8	8	170	5		105	30.2	**2403 257 54206**
		AD 40725/X15	15	170	5		105	30.2	**2403 257 54207**
		AD 40725/X25	25	170	5		105	30.2	**2403 257 54208**
		AD 44725/X4	4	170	5	105	105	30.2	**2403 257 54805**
		AD 44725/X8	8	170	5	105	105	30.2	**2403 257 54806**
		AD 44725/X15	15	170	5	105	105	30.2	**2403 257 54807**
		AD 44725/X25	25	170	5	105	105	30.2	**2403 257 54808**

* = square magnet

For detailed information on these and other types see Data Handbook C3

Full range round loudspeakers

						dimensions			
frame size inches	core diam.	Extended type number	imp. Ω	res. freq. Hz	power handling capacity	flange width mm	flange length mm	mounting depth mm	cat. number
4	28/10*	**AD 4074/X4**	4	170	2.5		105	42	**2403 257 24305**
		AD 4074/X8	8	170	2.5		105	42	**2403 257 24306**
		AD 4074/X15	15	170	2.5		105	42	**2403 257 24307**
		AD 4074/X25	25	170	2.5		105	42	**2403 257 24308**
		AD 4474/X4	4	170	2.5	105	105	42	**2403 257 24705**
		AD 4474/X8	8	170	2.5	105	105	42	**2403 257 24706**
		AD 4474/X15	15	170	2.5	105	105	42	**2403 257 24707**
		AD 4474/X25	25	170	2.5	105	105	42	**2403 257 24708**
		AD 40745/X4	4	170	3.5		105	42	**2403 257 54305**
		AD 40745/X8	8	170	3.5		105	42	**2403 257 54306**
		AD 40745/X15	15	170	3.5		105	42	**2403 257 54307**
		AD 40745/X25	25	170	3.5		105	42	**2403 257 54308**
		AD 44745/X4	4	170	3.5	105	105	42	**2403 257 54705**
		AD 44745/X8	8	170	3.5	105	105	42	**2403 257 54706**
		AD 44745/X15	15	170	3.5	105	105	42	**2403 257 54707**
		AD 44745/X25	25	170	3.5	105	105	42	**2403 257 54708**
		AD 40743/X4	4	170	2.5		105	42	**2403 257 24405**
		AD 40743/X8	8	170	2.5		105	42	**2403 257 24406**
		AD 40743/X15	15	170	2.5		105	42	**2403 257 24407**
		AD 40743/X25	25	170	2.5		105	42	**2403 257 24408**
		AD 44743/X4	4	170	2.5	105	105	42	**2403 257 24505**
		AD 44743/X8	8	170	2.5	105	105	42	**2403 257 24506**
		AD 44743/X15	15	170	2.5	105	105	42	**2403 257 24507**
		AD 44743/X25	25	170	2.5	105	105	42	**2403 257 24508**
		AD 40743/X4A	4	170	3.5		105	42	**2403 257 54405**
		AD 40743/X8A	8	170	3.5		105	42	**2403 257 54406**
		AD 40743/X15A	15	170	3.5		105	42	**2403 257 54407**
		AD 40743/X25A	25	170	3.5		105	42	**2403 257 54408**
		AD 44743/X4A	4	170	3.5	105	105	42	**2403 257 54505**
		AD 44743/X8A	8	170	3.5	105	105	42	**2403 257 54506**
		AD 44743/X15A	15	170	3.5	105	105	42	**2403 257 54507**
		AD 44743/X25A	25	170	3.5	105	105	42	**2403 257 54508**

* = square magnet

For detailed information on these and other types see Data Handbook C3

Full range round loudspeakers

						dimensions			
frame size inches	core diameter	Extended type number	imp. Ω	res. freq. Hz	power handling capacity	flange width mm	flange length mm	mounting depth mm	cat. number
4	45/14	**WD 40925/X4**	4	150	7		105	40.7	**2403 253 00601**
		WD 40925/X8	8	150	7		105	40.7	**2403 253 00602**
		WD 40925/X15	15	150	7		105	40.7	**2403 253 00603**
		WD 40925/X25	25	150	7		105	40.7	**2403 253 00604**
		WD 44925/X4	4	150	7	105	105	40.7	**2403 253 00701**
		WD 44925/X8	8	150	7	105	105	40.7	**2403 253 00702**
		WD 44925/X15	15	150	7	105	105	40.7	**2403 253 00703**
		WD 44925/X25	25	150	7	105	105	40.7	**2403 253 00704**
		WD 40945/X4	4	150	7		105	51	**2403 253 00801**
		WD 40945/X8	8	150	7		105	51	**2403 253 00802**
		WD 40945/X15	15	150	7		105	51	**2403 253 00803**
		WD 40945/X25	25	150	7		105	51	**2403 253 00804**
		WD 44945/X4	4	150	7	105	105	51	**2403 253 00901**
		WD 44945/X8	8	150	7	105	105	51	**2403 253 00902**
		WD 44945/X15	15	150	7	105	105	51	**2403 253 00903**
		WD 44945/X25	25	150	7	105	105	51	**2403 253 00904**
		WD 40965/X4	4	150	7		105	51	**2403 253 01001**
		WD 40965/X8	8	150	7		105	51	**2403 253 01002**
		WD 40965/X15	15	150	7		105	51	**2403 253 01003**
		WD 40965/X25	25	150	7		105	51	**2403 253 01004**
		WD 44965/X4	4	150	7	105	105	51	**2403 253 01101**
		WD 44965/X8	8	150	7	105	105	51	**2403 253 01102**
		WD 44965/X15	15	150	7	105	105	51	**2403 253 01103**
		WD 44965/X25	25	150	7	105	105	51	**2403 253 01104**
4	45/18	**AD 44900/P4M**	4	110	8	102	102	52.6	**2422 257 44305**
		AD 44900/P8M	8	110	8	102	102	52.6	**2422 257 44306**
		AD 44900/P15M	15	110	8	102	102	52.6	**2422 257 44307**
		AD 44900/X4	4	100	8	102	102	52.6	**2422 257 44201**
		AD 44900/X8	8	100	8	102	102	52.6	**2422 257 44202**
		AD 44900/X15	15	100	8	102	102	52.6	**2422 257 44203**
4	60/18	**AD 44400/M4K**	4	110	15	102	102	47.6	**2422 257 44101**
		00 44401/X4	4	85	12	102	102	47.6	**2404 257 44104**
5	53/18	**AD 50800/M4**	4	140	6		120	46	**2422 257 25105**
		AD 50800/M8	8	140	6		120	46	**2422 257 25106**
5	60/18	**AD 50410/M4K**	4	108	15		120	46.4	**2404 257 45311**

Full range round (cont.)

For detailed information on these and other types see Data Handbook C3

Full range round loudspeakers

frame size inches	core diam.	Extended type number	imp. Ω	res. freq. Hz	power handling capacity	dimensions			cat. number
						flange width mm	flange length mm	mounting depth mm	
5.25	28/10*	**WD 50720/X4**	4	130	3		131	45	**2403 251 10001**
		WD 50720/X8	8	130	3		131	45	**2403 251 10002**
		WD 50720/X15	15	130	3		131	45	**2403 251 10003**
		WD 50720/X25	25	130	3		131	45	**2403 251 10004**
		WD 55720/X4	4	130	3	131	131	45	**2403 251 10101**
		WD 55720/X8	8	130	3	131	131	45	**2403 251 10102**
		WD 55720/X15	15	130	3	131	131	45	**2403 251 10103**
		WD 55720/X25	25	130	3	131	131	45	**2403 251 10104**
		WD 50725/X4	4	130	5		131	45	**2403 251 10601**
		WD 50725/X8	8	130	5		131	45	**2403 251 10602**
		WD 50725/X15	15	130	5		131	45	**2403 251 10603**
		WD 50725/X25	25	130	5		131	45	**2403 251 10604**
		WD 55725/X4	4	130	5	131	131	45	**2403 251 10701**
		WD 55725/X8	8	130	5	131	131	45	**2403 251 10702**
		WD 55725/X15	15	130	5	131	131	45	**2403 251 10703**
		WD 55725/X25	25	130	5	131	131	45	**2403 251 10704**
		WD 50740/X4	4	130	2.5		131	58.5	**2403 251 10201**
		WD 50740/X8	8	130	2.5		131	58.5	**2403 251 10202**
		WD 50740/X15	15	130	2.5		131	58.5	**2403 251 10203**
		WD 50740/X25	25	130	2.5		131	58.5	**2403 251 10204**
		WD 55740/X4	4	130	2.5	131	131	58.5	**2403 251 10301**
		WD 55740/X8	8	130	2.5	131	131	58.5	**2403 251 10302**
		WD 55740/X15	15	130	2.5	131	131	58.5	**2403 251 10303**
		WD 55740/X25	25	130	2.5	131	131	58.5	**2403 251 10304**
		WD 50745/X4	4	130	3.5		131	58.5	**2403 251 10801**
		WD 50745/X8	8	130	3.5		131	58.5	**2403 251 10802**
		WD 50745/X15	15	130	3.5		131	58.5	**2403 251 10803**
		WD 50745/X25	25	130	3.5		131	58.5	**2403 251 10804**
		WD 55745/X4	4	130	3.5	131	131	58.5	**2403 251 10901**
		WD 55745/X8	8	130	3.5	131	131	58.5	**2403 251 10902**
		WD 55745/X15	15	130	3.5	131	131	58.5	**2403 251 10903**
		WD 55745/X25	25	130	3.5	131	131	58.5	**2403 251 10904**
		WD 50760/X4	4	130	2.5		131	58.5	**2403 251 10401**
		WD 50760/X8	8	130	2.5		131	58.5	**2403 251 10402**
		WD 50760/X15	15	130	2.5		131	58.5	**2403 251 10403**
		WD 50760/X25	25	130	2.5		131	58.5	**2403 251 10404**
		WD 55760/X4	4	130	2.5	131	131	58.5	**2403 251 10501**
		WD 55760/X8	8	130	2.5	131	131	58.5	**2403 251 10502**
		WD 55760/X15	15	130	2.5	131	131	58.5	**2403 251 10503**
		WD 55760/X25	25	130	2.5	131	131	58.5	**2403 251 10504**
		WD 50765/X4	4	130	3.5		131	58.5	**2403 251 11001**
		WD 50765/X8	8	130	3.5		131	58.5	**2403 251 11002**
		WD 50765/X15	15	130	3.5		131	58.5	**2403 251 11003**
		WD 50765/X25	25	130	3.5		131	58.5	**2403 251 11004**
		WD 55765/X4	4	130	3.5	131	131	58.5	**2403 251 11101**
		WD 55765/X8	8	130	3.5	131	131	58.5	**2403 251 11102**
		WD 55765/X15	15	130	3.5	131	131	58.5	**2403 251 11103**
		WD 55765/X25	25	130	3.5	131	131	58.5	**2403 251 11104**

* = square magnet

For detailed information on these and other types see Data Handbook C3

Full range round loudspeakers

						dimensions			
frame size inches	core diam.	Extended type number	imp. Ω	res. freq. Hz	power handling capacity	flange width mm	flange length mm	mounting depth mm	cat. number
5.25	45/14	**WD 50925/X4**	4	130	8		131	50	**2403 253 10601**
		WD 50925/X8	8	130	8		131	50	**2403 253 10602**
		WD 50925/X15	15	130	8		131	50	**2403 253 10603**
		WD 50925/X25	25	130	8		131	50	**2403 253 10604**
		WD 55925/X4	4	130	8	131	131	50	**2403 253 10701**
		WD 55925/X8	8	130	8	131	131	50	**2403 253 10702**
		WD 55925/X15	15	130	8	131	131	50	**2403 253 10703**
		WD 55925/X25	25	130	8	131	131	50	**2403 253 10704**
		WD 51921/M4W	4	80	6		131	50	**2403 253 11301**
		WD 55925/M4W	4	80	9	131	131	50	**2403 253 11501**
		WD 55925/X4W	4	80	9	131	131	50	**2403 253 11401**
		WD 50945/X4	4	130	7		131	60.8	**2403 253 10801**
		WD 50945/X8	8	130	7		131	60.8	**2403 253 10802**
		WD 50945/X15	15	130	7		131	60.8	**2403 253 10803**
		WD 50945/X25	25	130	7		131	60.8	**2403 253 10804**
		WD 55945/X4	4	130	7	131	131	60.8	**2403 253 10901**
		WD 55945/X8	8	130	7	131	131	60.8	**2403 253 10902**
		WD 55945/X15	15	130	7	131	131	60.8	**2403 253 10903**
		WD 55945/X25	25	130	7	131	131	60.8	**2403 253 10904**
		WD 50965/X4	4	130	7		131	60.8	**2403 253 11001**
		WD 50965/X8	8	130	7		131	60.8	**2403 253 11002**
		WD 50965/X15	15	130	7		131	60.8	**2403 253 11003**
		WD 50965/X25	25	130	7		131	60.8	**2403 253 11004**
		WD 55965/X4	4	130	7	131	131	60.8	**2403 253 11101**
		WD 55965/X8	8	130	7	131	131	60.8	**2403 253 11102**
		WD 55965/X15	15	130	7	131	131	60.8	**2403 253 11103**
		WD 55965/X25	25	130	7	131	131	60.8	**2403 253 11104**
5.25	60/18	**AD 51400/M4**	4	130	6		130	51	**2422 257 35812**
		AD 51410/M4K	4	90	15		130	51	**2422 257 45501**

For detailed information on these and other types see Data Handbook C3

Full range round loudspeakers

						dimensions			
frame size inches	core diam.	Extended type number	imp. Ω	res. freq. Hz	power handling capacity	flange width mm	flange length mm	mounting depth mm	cat. number
7	28/10*	**WD 77725/X4**	4	100	5	160	160	47.5	**2403 251 20701**
		WD 77725/X8	8	100	5	160	160	47.5	**2403 251 20702**
		WD 77725/X15	15	100	5	160	160	47.5	**2403 251 20703**
		WD 77725/X25	25	100	5	160	160	47.5	**2403 251 20704**
		WD 77745/X4	4	100	3.5	160	160	62	**2403 251 20901**
		WD 77745/X8	8	100	3.5	160	160	62	**2403 251 20902**
		WD 77745/X15	15	100	3.5	160	160	62	**2403 251 20903**
		WD 77745/X25	25	100	3.5	160	160	62	**2403 251 20904**
		WD 77765/X4	4	100	3.5	160	160	62	**2403 251 21101**
		WD 77765/X8	8	100	3.5	160	160	62	**2403 251 21102**
		WD 77765/X15	15	100	3.5	160	160	62	**2403 251 21103**
		WD 77765/X25	25	100	3.5	160	160	62	**2403 251 21104**
7	45/14	**WD 70925/X4**	4	100	12		160	52.5	**2403 253 20601**
		WD 70925/X8	8	100	12		160	52.5	**2403 253 20602**
		WD 70925/X15	15	100	12		160	52.5	**2403 253 20603**
		WD 70925/X25	25	100	12		160	52.5	**2403 253 20604**
		WD 77925/X4	4	100	12	160	160	52.5	**2403 253 20701**
		WD 77925/X8	8	100	12	160	160	52.5	**2403 253 20702**
		WD 77925/X15	15	100	12	160	160	52.5	**2403 253 20703**
		WD 77925/X25	25	100	12	160	160	52.5	**2403 253 20704**
		WD 71926/X4	4	100	12		160	52.5	**2403 253 21501**
		WD 71926/X8	8	100	12		160	52.5	**2403 253 21502**
		WD 71926/X15	15	100	12		160	52.5	**2403 253 21503**
		WD 71926/X25	25	100	12		160	52.5	**2403 253 21504**
		WD 70945/X4	4	100	8		160	62.4	**2403 253 20801**
		WD 70945/X8	8	100	8		160	62.4	**2403 253 20802**
		WD 70945/X15	15	100	8		160	62.4	**2403 253 20803**
		WD 70945/X25	25	100	8		160	62.4	**2403 253 20804**
		WD 77945/X4	4	100	8	160	160	62.4	**2403 253 20901**
		WD 77945/X8	8	100	8	160	160	62.4	**2403 253 20902**
		WD 77945/X15	15	100	8	160	160	62.4	**2403 253 20903**
		WD 77945/X25	25	100	8	160	160	62.4	**2403 253 20904**
		WD 71946/X4	4	100	8		160	62.4	**2403 253 21601**
		WD 71946/X8	8	100	8		160	62.4	**2403 253 21602**
		WD 71946/X15	15	100	8		160	62.4	**2403 253 21603**
		WD 71946/X25	25	100	8		160	62.4	**2403 253 21604**
		WD 70965/X4	4	100	8		160	62.4	**2403 253 21001**
		WD 70965/X8	8	100	8		160	62.4	**2403 253 21002**
		WD 70965/X15	15	100	8		160	62.4	**2403 253 21003**
		WD 70965/X25	25	100	8		160	62.4	**2403 253 21004**
		WD 77965/X4	4	100	8	160	160	62.4	**2403 253 21101**
		WD 77965/X8	8	100	8	160	160	62.4	**2403 253 21102**
		WD 77965/X15	15	100	8	160	160	62.4	**2403 253 21103**
		WD 77965/X25	25	100	8	160	160	62.4	**2403 253 21104**
		WD 71966/X4	4	100	8		160	62.4	**2403 253 21701**
		WD 71966/X8	8	100	8		160	62.4	**2403 253 21702**
		WD 71966/X15	15	100	8		160	62.4	**2403 253 21703**
		WD 71966/X25	25	100	8		160	62.4	**2403 253 21704**

* = square magnet

For detailed information on these and other types see Data Handbook C3

Full range round loudspeakers

						dimensions			
frame size inches	core diam.	Extended type number	imp. Ω	res. freq. Hz	power handling capacity	flange width mm	flange length mm	mounting depth mm	cat. number
7	45/18	**AD 70845/M4**	4	100	8		165.2	56.5	**2422 257 47805**
		AD 70845/M8	8	100	8		165.2	56.5	**2422 257 47806**
		AD 70845/X4	4	100	8		165.2	56.5	**2422 257 47804**
		AD 70845/X8	8	100	8		165.2	56.5	**2422 257 47808**
7	53/18	**AD 70800/M4**	4	105	13		165.2	56.5	**2422 257 47405**
		AD 70800/M8	8	105	13		165.2	56.5	**2422 257 47406**
7	72/25	**AD 70631/M4**	4	63	15		165.2	60	**2422 257 47106**
		AD 70631/M8	8	63	15		165.2	60	**2422 257 47107**
8	53/18	**AD 80800/M4**	4	85	15		204.6	68.6	**2422 257 38705**
		AD 80800/M8	8	85	15		204.6	68.6	**2422 257 38706**
		AD 80800/P4	4	75	15		204.6	68.6	**2422 257 38715**
		AD 80800/P8	8	75	15		204.6	68.6	**2422 257 38716**
12	90/35	**AD 12672/M4**	4	45	60		312	128	**2422 257 41104**
		AD 12672/M8	8	45	60		312	128	**2422 257 41105**
12	121/35	**AD 12202/M4**	4	45	100		312	137	**2422 257 51201**
		AD 12202/M8	8	45	100		312	137	**2422 257 51202**
		AD 12202/M15	15	45	100		312	137	**2422 257 51203**

Recommended combinations for colour television

For detailed information on these and other types see Data Handbook C20

90°

picture tube	A37–573X	A37–590X A37–591X	A42–570X
deflection unit	AT1205	AT1206	AT1215
screen diagonal	37 cm	37 cm	42 cm
multipole	AT1052	AT1052	AT1052
degaussing coil single insulation	3122 138 99840	3122 138 99840	3122 138 99850
mains filter choke	AT4043/90	AT4043/90	AT4043/90
switched mode driver transformer	–	AT4043/29	–
switched mode transformer	AT3010/90L	–	AT3010/90L
mains transformer	–	TS561	–
input choke	–	AT4043/81	–
synchronous power pack transformer	–	AT2077/80	–
line output transformer	AT2079/10	–	AT2079/10
linearity control unit	AT4042/04A or AT4042/91	AT4042/91	AT4042/04A or AT4042/91

Recommended combinations for colour television (cont.)

For detailed information on these and other types see Data Handbook C20

90°

picture tube deflection unit screen diagonal	A42–592X A42–593X AT1216 or AT1470 42 cm	A51–570X AT1237 51 cm	A51–590X A51–591X AT1236 or AT1480 51 cm
multipole	AT1052	AT1052	AT1052
degaussing coil single insulation	3122 138 99850	3122 138 56070	3122 138 56070
mains filter choke	AT4043/90	AT4043/90	AT4043/90
switched mode driver transformer	AT4043/29	–	AT4043/29
switched mode transformer	–	AT3010/90L	–
mains transformer	TS561	–	TS561
input choke	AT4043/81	–	AT4043/81
synchronous power pack transformer	AT2077/80	–	AT2077/80
line output transformer	–	AT2079/10	–
linearity control unit	AT4042/91	AT4042/04A or AT4042/91	AT4042/91

Recommended combinations for colour television (cont.)

For detailed information on these and other types see Data Handbook C20

110°

picture tube deflection unit screen diagonal	A51–540X AT1850 51 cm	A51–540X AT1850 51 cm	A56–540X AT1860 56 cm
degaussing coil			
single insulation	3122 138 55220	–	3122 138 55220
double insulation	–	3122 138 56320	–
mains filter choke	AT4043/55 or /90	AT4043/55 or /90	AT4043/55 or /90
driver transformer	–	AT4043/29	–
switched mode transformer	AT3010/110LL	–	AT3010/110LL
mains transformer	TS561	TS561	TS561
current sensing transformer	–	AT4043/46	–
bridge coil	AT4043/100	AT4043/100	AT4043/100
east/west choke	AT4043/60	AT4043/60	AT4043/60
input choke	–	AT4043/16A	–
line output transformer	AT2077/81 or AT2078/..	AT2077/82	AT2077/81 or AT2028/..
audio choke	–	AT4043/96	–
power pack system line choke	–	AT4043/53	–
linearity control unit or linearity corrector	AT4042/08A or AT4042/90	AT4042/90	AT4042/08A or AT4042/90

Recommended combinations for colour television (cont.)

For detailed information on these and other types see Data Handbook C20

110°

picture tube deflection unit screen diagonal	A56–540X AT1860 66 cm	A66–540X AT1870	A66–540X AT1870
degaussing coil			
single insulation	–	3122 138 55230	–
double insulation	3122 138 56320	–	3122 138 56310
mains filter choke	AT4043/55 or /90	AT4043/55 or /90	AT4043/55 or /90
driver transformer	AT4043/29	–	AT4043/29
switched mode transformer	–	AT3010/110LL	–
mains transformer	TS561	TS561	TS561
current sensing transformer	AT4043/46	–	AT4043/46
bridge coil	AT4043/100	AT4043/100	AT4043/100
east/west choke	AT4043/60	AT4043/60	AT4043/60
input choke	AT4043/16A	–	AT4043/16A
line output transformer	AT2077/82	AT2077/81 or AT2078/..	AT2077/82
audio choke	AT4043/96	–	AT4043/96
power pack system line choke	AT4043/53	–	AT4043/53
linearity control unit or linearity corrector	AT4042/90	AT4042/08A or AT4042/90	AT4042/90

Recommended combinations for colour DGD designs

For detailed information on these and other types see Data Handbook C20

Line freq.	16 kHz			24 kHz
	medium resolution	high resolution		high resolution
	14 inch	10 inch	14 inch	14 inch
colour monitor	M34EAQ00X01	25QARB22N–TC03	M37–103X/N/1020	M37–103X/N/1020
tube assemb.	M34EAQ10X01	(M25–100X/N/4130)	M37–108X/N/1020 M37–118X/N/1020	M37–108X/N/1020 M37–118X/N/1020
inductance of line defl. coils	1.9 mH	1.93 mH	1.2 mH	1.2 mH
line output transformer	AT2077/81	AT2077/81	AT2077/32	AT2077/32
linearity control unit	AT4042/34	AT4042/04A or AT4042/08A	AT4042/08A	AT4042/08A
driver transformer	AT4043/01	AT4043/01	AT4043/01	AT4043/01
shift transformer	–	AT4043/09	AT4043/09	AT4043/09
dynamic focus. transformer	–	–	–	–
bridge coil	AT4043/68	AT4043/68	AT4043/68	AT4043/68

Recommended combinations for colour DGD designs

For detailed information on these and other types see Data Handbook C20

Line freq.	32 kHz		45 kHz	64 kHz
	high resolution		high resolution	high resolution
	14 inch	20 inch	14 inch	20 inch
colour monitor	M37–103X/N/1030	–	M37–103X/N/1050	–
tube assemb.	M37–108X/N/1030 M37–108X/N/1030	M51–107X/N/7171 –	M37–108X/N/1050 M37–118X/N/1050	M48JF58X32 –
inductance of line defl. coils	0.3 mH	0.71 mH	0.14–0.16 mH	0.18 mH
line output transformer	AT2077/32	AT2077/32	AT2077/85 or AT2077/85A	AT2077/60 or AT2077/85A
linearity control unit	AT4042/32A	AT4042/32A	AT4042/32A	AT4042/32A
driver transformer	AT4043/01	AT4043/01	AT4043/87	2 x AT4043/87 + AT4043/01
shift transformer	AT4043/09	AT4043/09	AT4043/09	AT4043/09
dynamic focus. transformer	–	AT4043/67	–	–
bridge coil	AT4043/68	AT4043/68	AT4043/13	AT4043/08A

Recommended combinations for monochrome DGD designs

For detailed information on these and other types see Data Handbook C20

design designation	C6E, C6E–FS	C9, C9–FS	C64, C64–FS	C64, C64–FS
deflection angle	90	90	110	110
format	landscape	landscape	landscape	portrait
tube				
7–inch				
7–inch				
7–inch				
9–inch	M24–306			
12–inch	M31–340	M31–340	M31–326	
12–inch FS	M29EAA	M29EAA		
14–inch	M32EAA	M32EAA		
14–inch F		M32EBL		
15–inch			M38328	M38328
15–inch FS			M36EAB	M36EAB
17–inch			M41EAA	
20–inch			M47EAA	
deflection yoke				
7–inch				
9–inch	AT1078/09P			
12–inch	AT1078/02P	AT1078/01T	AT1039/03	
12–inch FS	AT1078/02P	AT1078/10		
14–inch	AT1078/34P	AT1078/04		
14–inch F		AT1078/11		
15–inch			AT1039/01	AT1039/00
15–inch FS			AT1039/21	AT1039/20
17–inch			AT1039/09	
20–inch			AT1039/09	
line output 1)	AT2140/16*	AT2250/14*	AT2077/84**	AT2077/84**
transformer 2)	AT2140/17*	AT2250/14*		
linearity control	AT4042/08A	AT4042/08A	AT4042/33A	AT4042/33A
line driver transformer			AT4043/64	AT4043/64
dynamic focus transformer		AT4043/67***		
E.H.T. stabilizer				
DC picture shift			AT4043/29	AT4043/29
width control	AT4044/39D	AT4044/39N	AT4044/35	AT4044/35

* E.H.T. cable 3122 137 63920 is required

** E.H.T. cable 3122 137 63370 is required

*** for flat square or flat application

Recommended combinations for monochrome DGD designs

For detailed information on these and other types see Data Handbook C20

design designation	C6E, C6E–FS	C9, C9–FS	C64, C64–FS	C64, C64–FS
deflection angle	90	90	110	110
format	landscape	landscape	landscape	portrait
characters per line	40–80	80	100–132	100–132
display capability				
supply (V)	12	12	30–120	30–120
E.H.T. (kV)	12–13	13	17,2	17
line frequency (kHz)	1) 15–22 2) 22–30	22–30 30–40	15–50	15–70

Recommended combinations for monochrome DGD designs

For detailed information on these and other types see Data Handbook C20

design designation	C64–LITZE	C52	C53, C54	C55	C71, C72
deflection angle	110	110°	90°	90°	70°
format	landscape	portrait	landscape potrait	landscape potrait	landscape
tube					
7–inch					M17–140
7–inch					M17–220
7–inch					M17–230
9–inch					
12–inch					
12–inch FS					
14–inch					
14–inch F					
15–inch		M38–200			
15–inch FS					
17–inch	M41EAA				
20–inch	M47EAA		227M51	230M51	
deflection yoke					
7–inch					AT1071/07
9–inch					
12–inch					
12–inch FS					
14–inch					
14–inch F					
15–inch		AT1991			
15–inch FS					
17–inch	AT1037/01				
20–inch	AT1037/01		AT1991	AT1991	
line output 1) transformer 2)	AT2077/84**	AT2077/84**	AT2077/84**	AT2077/84**	AT2077/84**
linearity control	AT4042/33A		AT4042/31L	AT4042/31L	AT4042/08A or AT4042/33A
line driver transformer	AT4043/64	AT4043/87	AT4043/30L	AT4043/64	AT4043/64
dynamic focus transformer					
E.H.T. stabilizer		AT4041/52	AT4041/52		
DC picture shift	AT4043/29		AT4043/29		AT4043/29
width control	AT4044/35				

** E.H.T. cable 3122 137 63370 is required

Recommended combinations for monochrome DGD designs

For detailed information on these and other types see Data Handbook C20

design designation	C64–LITZE	C52	C53, C54	C55	C71, C72
deflection angle	110	110°	90°	90°	70°
format	landscape	portrait	landscape potrait	landscape potrait	landscape
characters per line	100–132				
display capability		4 x 10^6 pixels	4 x 10^6 pixels	4 x 10^6 pixels	2 x 10^6 pixels
supply (V)	30–120	120	100–200	100–200	20–105
E.H.T. (kV)	18	17	20	20	15
line frequency (kHz)	15–70	125	64–125	15–70	

Selection guide

For detailed information see Data Handbook C4/C5

Section	Catalogue page number
Material grades	M48
RM – cores	M49
RM/i – cores	M51
P – cores	M55
P – cores for proximity switches	M58
E – cores	M59
EF – cores	M59
ETD – cores	M61
EC – cores	M63
U – cores	M64
I – cores	M64
Ring cores	M66
Iron powder ring cores	M67
Rods	M68
Impeder cores	M69
Tubes	M70
RFI – suppression beads	M71
RFI – suppression beads on wire	M72
Multihole tubes	M73
Wide band chokes	M74
Yoke rings	M75

Material grades

For detailed information on these and other types see Data Handbook C4/C5

Our soft ferrites (Ferroxcube) are available in a range of core shapes suitable for many different applications. The following table is a survey of their main properties.

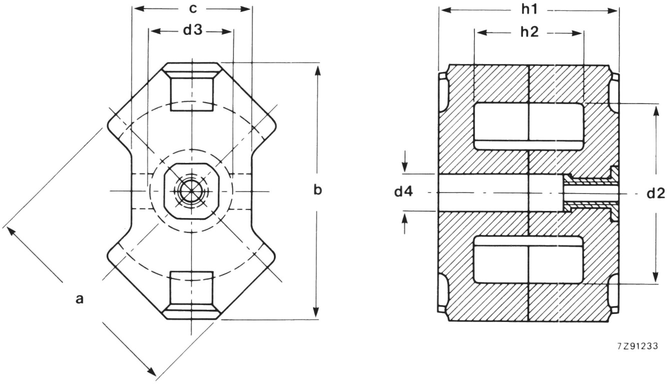
Main characteristics of the different Ferroxcube grades.

grade	µi ±20 %	flux density B at 3000 A/m 25 °C mT	curie temp. °C	resistivity Ωm	ferrite type	main application area	available core shapes
4D1	50	≠ 240	⩾400	10^3	NiZn	HF–tuning	beads,rods,tubes
4C6	100	380	350	10^3	NiZn	telecom filters	P,RM
4C65	125	380	350	10^3	NiZn	HF–tuning suppression	ring cores
4B1	250	350	250	10^5	NiZn	HF–tuning suppression	beads
6B1	250	350	250	10^3	LiZn	HF–tuning suppresion	rods,tubes
2A2	350	250	135	10^6	MgZn	deflection coils	yoke rings
4A11	600	350	125	10^5	NiZn	suppression	ring cores
4S2	600	350	125	10^5	NiZn	supression	beads
3D3	750	400	200	2	MnZn	telecom filters	P,RM
3B1	900	400	150	0.2	MnZn	suppression	rods,tubes,beads
3C2	900	400	150	0.1	MnZn	deflection coils	yoke rings
3H1	2300	400	130	1	MnZn	telecom filters	P,RM
3H3	2000	450	160	2	MnZn	telecom filters	P,RM
3C8	2000	500	200	1	MnZn	LF–power	E,EF,ETD,EC,U,I
3C85	2000	500	200	1	MnZn	MF–power	E,EF,ETD,EC,rods,rings,P,RM
3F3	2000	500	200	2	MnZn	HF–power	E,EF,ETD,P,RM rings
3B8	2300	500	200	1	MnZn	MF–power	P,RM
3S1	4000	400	125	0.3	MnZn	suppression	beads
3C11	4300	400	125	0.3	MnZn	supression	rings,EF
3E4	4700	400	125	0.3	MnZn	pulse transformers	RM
3E25	6000	400	125	0.1	MnZn	suppression	rings
3E5	10000	350	120	0.01	MnZn	pulse transformers	RM

For detailed information on these and other types see Data Handbook C4/C5

RM–cores (**Rectangular Module**) have been developed for use in analog, high density telecommunications. They are standardised to IEC–205.
available types:

- core halves without air gap and nut
- gapped sets of cores within a range of AL–values, with or without moulded in nuts
- inductance adjusters
- coilformers and clips



type	dimensions (mm)								Ve mm^3	Ae mm^3	le mm
	a	b	c	d2	d3	d4	h1	h2			
RM4	9.8	11	4.6	8	3.9	2.04	10.4	7	230	11.0	21.3
RM5	12.3	14.6	6.8	10.2	4.9	2.04	10.4	6.3	450	21.2	21.4
RM6R	14.7	17.9	6.3	12.6	6.3	3	12.4	8	810	32.0	25.6
RM6S	14.7	17.9	8.2	12.4	6.2	3	12.4	8	840	31.0	27.3
RM8	19.7	23.2	11	17	8.4	4.4	16.4	10.8	1850	52.0	35.5
RM10	24.7	28.5	13.5	21.2	10.9	5.4	18.7	12.4	3470	83.2	41.7

Ungapped cores (without nut)

	4C6	3D3	3H3	3H1
RM4	**4322 020 26530**	**4322 020 26520**	**4322 020 26540**	**4322 020 26510**
RM5	**4322 020 26780**	**4322 020 26770**	**4322 020 26790**	**4322 020 26760**
RM65	**4322 020 25080**	**4322 020 25060**	**4322 020 2520**	**4322 020 25020**
RM6R	**4322 020 25150**	**4322 020 25140**	**4322 020 25190**	**4322 020 2513**
RM8	**4322 020 27280**	**4322 020 27270**	**4322 020 27290**	**4322 020 27260**
RM10				**4322 020 28400**

For gapped core sets and recommended adjusters see handbook C4/C5.

Accessories for RM–cores

For detailed information on these and other types see Data Handbook C4/C5

RM–coilformers are well adapted to automatic winding and are made of a phenolic thermosetting resin (Ul 94–Vo).
The clips deliver adequate clamping force for high stability. Round back clips may also be used, however, their clamping force is lower.

Coil formers – 1 section

RM core type	cat. number 4 pins	cat. number 6 pins	cat. number 12 pins
RM4	–	**4322 021 32210**	–
RM5	**4322 021 32830**	**4322 021 32840**	–
RM6R	**4322 021 32280**	**4322 021 32290**	–
RM6S	**4312 021 29240**	**4312 021 29250**	–
RM8	–	–	**4322 021 32390**
RM10	–	–	**4322 021 32470**

Coil formers – 2 sections

RM core type	cat. number 6 pins	cat. number 8 pins	cat. number 12 pins
RM6R	**4322 021 32310**	–	–
RM6S	**4322 021 32950**	–	–
RM8	–	**4322 021 32420**	–
RM10	–	–	**4322 021 32790**

Clips

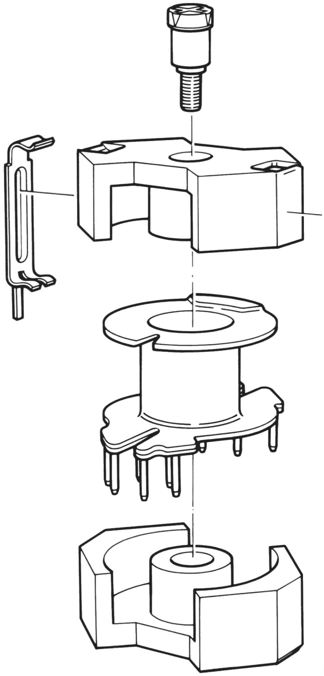
RM core type	catalogue number		
RM4	**4322 021 31900**		
RM5	**4322 021 31900**		
RM6S/R	**4322 021 31780**		
RM8	**4322 021 31840**		
RM10	**4322 021 34320**		

General data
RM/i–cores

For detailed information on these and other types see Data Handbook C4/C5

RM/i–cores have no central hole and are very suitable for use in small power transformers, general purpose transformers and chokes. The dimensions are according to IEC–205.

Types available are:
- ungapped cor halves
- gapped core sets within a standard range of AL–values
- coilformers and clips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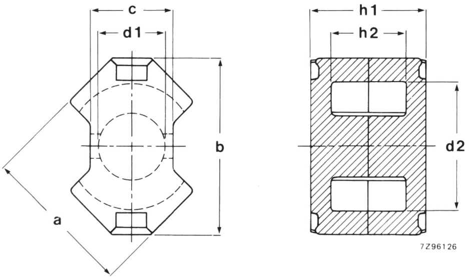

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core type	dimensions (mm)							magnetic dimensions		
	a	b	c	d1	d2	h1	h2	V_e (mm^3)	A_e (mm^2)	l_e (mm)
RM4/i	9.9	11.1	4.6	3.9	8	10.4	7	322	14.4	23.3
RM5/i	12.4	14.7	6.8	4.9	10.2	10.4	6.3	574	24.8	23.2
RM6–S/i	14.8	18	8.2	6.3	12.4	12.4	8	1090	37	29.2
RM8/i	20.0	23.4	11.1	8.4	16.9	16.4	10.8	2440	63	38.4
RM10/i	24.8	28.6	13.6	11	21.1	18.6	12.3	4310	96.6	44.6
RM12/i	29.9	37.6	16.5	12.9	24.8	24.5	16.6	8340	146	56.6
RM14/i	35	42.5	19	15.1	28.9	30.1	20.6	13900	198	70

For detailed information on these and other types see Data Handbook C4/C5

Range of ungapped cores

type	grade	A_L	cat. number core halves without air gap
RM4/i	3E4	2500 + 40% – 25%	4322 020 26610
	3E5	3500 + 40% – 30%	4322 020 26620
	3F3	1000 ± 25%	4322 020 26600
RM5/i	3B8	2000 ±25%	4322 020 27080
	3C85	1800 ± 25%	4322 020 27100
	3E4	4500 + 40% – 25%	4322 020 27120
	3E5	6300 + 40% – 25%	4322 020 27130
	3F3	1800 ± 25%	4322 020 27110
RM6–S/i	3B8	2700 ±25%	4322 020 27930
	3C85	2400 ± 25%	4322 020 27950
	3E4	5800 + 40% – 25%	4322 020 55500
	3E5	8600 + 40% – 25%	4322 020 55510
	3F3	2400 ± 25%	4322 020 27970
RM8/i	3B8	3900 ±25%	4322 020 27420
	3C85	3300 ± 25%	4322 020 28170
	3E4	8000 + 40% – 25%	4322 020 28190
	3E5	13000 + 40% – 25%	4322 020 28230
	3F3	3300 ± 25%	4322 020 28220
RM10/i	3B8	5300 ±25%	4322 020 28370
	3C85	4500 ± 25%	4322 020 28430
	3E4	11000 + 40% – 25%	4322 020 28490
	3E5	18000 + 40% – 25%	4322 020 55250
	3F3	4500 ± 25%	4322 020 28450
RM12/i	3C85	5500 ± 25%	4322 020 55010
	3E4	13000 + 40% – 25%	4322 020 55030
	3F3	5500 ± 25%	4322 020 55020
RM14/i	3C85	6300 ± 25%	4322 020 24870
	3F3	6300 ± 25%	4322 020 28480

Accessories for RM/i–cores

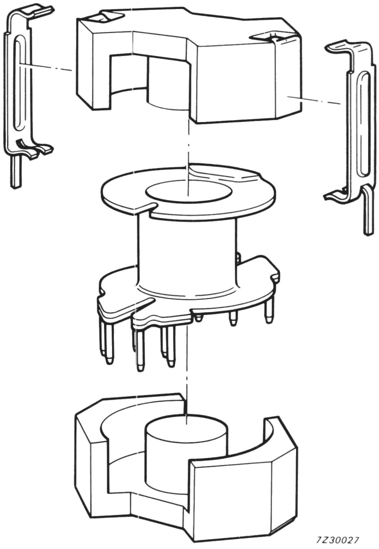
For detailed information on these and other types see Data Handbook C4/C5

Two types of coilformers are available:

- phenolic coilformers, also used for the RM–range (Ul 94–Vo)
- dual–in–line coilformers for power transformers, material: polyterephtalate (Ul 94–Vo)

Two types of clips may be used:

- straight–backed types for high clamping forces
- rounded–backed types for easier assembly and lower clamping forces



Coil formers – 1 section

RM core type	cat. number 4 pins	cat. number 6 pins	cat. number 12 pins
RM4	–	**4322 021 32210**	–
RM5	**4322 021 32830**	**4322 021 32840**	–
RM6R	**4322 021 32280**	**4322 021 32290**	–
RM6S	**4312 021 29240**	**4312 021 29250**	–
RM8	–	–	**4322 021 32390**
RM10	–	–	**4322 021 32470**
RM14	–	–	**4322 021 33530**

Coil formers – 2 sections

RM core type	cat. number 6 pins	cat. number 8 pins	cat. number 12 pins
RM6R	**4322 021 32310**	–	–
RM6S	**4322 021 32950**	–	–
RM8	–	**4322 021 32420**	–
RM10	–	–	**4322 021 32790**

Accessories for RM/i–cores (cont.)

For detailed information on these and other types see Data Handbook C4/C5

Coil formers for power applications (DIL)

RM core type	number of pins	catalogue number
RM6–S/i	8	**4322 021 34040**
RM8/i	12	**4322 021 34050**
RM10/i	12	**4322 021 34060**
RM12/i	12	**4322 021 34110**
RM14/i	12	**4322 021 34070**

Clips

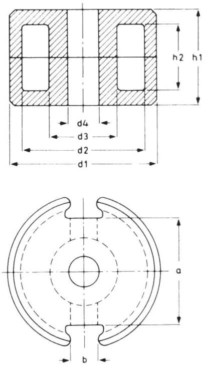
RM core type	catalogue number	RM/i core type	catalogue number
RM4	**4322 021 31900**	RM4/i	**4322 021 34290**
RM5	**4322 021 31900**	RM5/i	**4322 021 34290**
RM6S/R	**4322 021 31780**	RM6S/R/i	**4322 021 34300**
RM8	**4322 021 31840**	RM8/i	**4322 021 34310**
RM10	**4322 021 34320**	RM10/i	**4322 021 34320**
		RM12/i	**4322 021 34910**
		RM14/i	**4322 021 34920**

For detailed information on these and other types see Data Handbook C4/C5

P–cores are not comparable with RM–cores when dense component packing and efficient winding are required. However, they are ideal when maximum magnetic shielding is required.

Types available are:

- core halves without airgap and nut
- gapped core sets within a standard (IEC) range of A_L–values, with or without moulded–in nut
- inductance adjusters
- core assembly hardware



The dimensions of potcores P11/7 to P42/42 are in accordance with the specifications:
IEC 133 (International)
C93–324 (France)
DIN 41294 (Germany)
BS 4061 (U.K.)

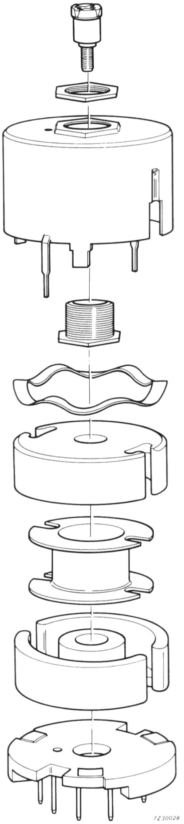
size	dimensions (mm)								core factor and effective dimensions			
	d1	d2	d3	d4	h1	h2	a	b	C_1 mm^{-1}	V_e mm^3	l_e mm	A_e mm^2
P5.8/3.3	5.8	4.5	2.5	0.95	3.3	3.2	–	1.4	1.68	37.0	7.9	4.7
P7.4/4.2	7.4	5.8	3	1.4	4.2	2.8	5.7	1.6	1.43	70.0	10.0	7.0
P9/5	9.3	7.5	3.9	2.04	5.4	3.6	6.5	2	1.24	126	12.5	10.1
P11/7	11.1	9	4.7	2.04	6.5	4.4	6.8	2.2	0.956	251	15.5	16.2
P14/8	14	11.6	6	3	8.4	5.6	9.5	3.3	0.789	495	19.8	25.1
P18/11	17.9	14.9	7.6	3	10.6	7.2	13.4	3.8	0.597	1120	25.8	43.3
P22/13	21.5	17.9	9.4	4.4	13.4	9.2	15	3.8	0.497	2000	31.5	63.4
P26/16	25.5	21.2	11.5	5.4	16	11	18	3.8	0.400	3530	37.6	93.9
P30/19	30	25	13.5	5.4	18.9	13	20.5	4.3	0.330	6190	45.2	137
P36/22	35.5	29.9	16	5.4	21.9	14.6	26.2	4.9	0.264	10700	53.2	202
P42/29	42.4	35.6	17.7	5.4	29.4	20.3	32	5.1	0.259	18200	68.6	265

Ungapped cores without nut (4322 020 .....)

core type	4C6	3D3	3H3	3H1	3B8	3C85	3F3
P5.8/3.3				**54**			
P7.4/4.2				**54600**			
P9/5	**20940**	**20900**		**20980**			
P11/7	**21140**	**21020**		**21010**	**28760**	**28840**	**28830**
P14/8	**21350**	**21270**		**21260**	**21400**	**29100**	**29090**
P18/11	**21610**	**21520**	**21650**	**21510**	**21670**	**29300**	**29290**
P22/13	**21830**	**21770**		**21760**	**21940**	**29570**	**29560**
P26/16	**22110**	**22020**		**22010**	**22220**	**29850**	**29840**
P30/19		**22270**		**22260**	**22390**	**22480**	**22470**
P36/22		**22520**		**22510**	**22610**	**22690**	**22670**
P42/29				**22760**		**22900**	**22880**

Accessories for P–cores

For detailed information on these and other types see Data Handbook C4/C5



Coil formers

potcore type	cat. number 1 section	cat. number 2 sections	cat. number 3 sections
P5.8/3.3	**4322 021 33550**	–	–
P7.4/4.2	**4322 021 32990**	–	–
P9/5	**4322 021 31700**	–	–
P11/7	**4322 021 30240**	–	–
P14/8	**4322 021 30250**	**4322 021 30260**	–
P18/11	**4322 021 30270**	**4322 021 30280**	**4322 021 30290**
P22/13	**4322 021 30300**	**4322 021 3031**	**4322 021 30320**
P26/16	**4322 021 30330**	**4322 021 30340**	**4322 021 3035**
P30/19	**4322 021 30360**	**4322 021 30370**	**4322 021 3038**
P36/22	**4322 021 30390**	**4322 021 30400**	**4322 021 3041**
P42/29	**4322 021 30420**	**4322 021 30430**	–

Accessories for P–cores (cont.)

For detailed information on these and other types see Data Handbook C4/C5

Mounting parts catalogue number 4322 021 .....

	P11/7	P14/8	P18/11	P22/13	P26/16	P30/19	P36/22	P42/29
Brass container	**30510**	**30520**	**30530**	**30540**	**30550**	**30560**	**30570**	**30580**
Tag plate	**30180**	**30440**	**30450**	**30460**	**30470**	**30480**	**30490**	**30500**
Spring	**30620**	**30630**	**30640**	**30650**	**30660**	**30670**	**30680**	**30690**
nut			**30710**	**3071**	**3071**	**3071**	**3071**	**3071**
fixing back			**30720**	**3072**	**3072**	**3072**	**3072**	**3072**

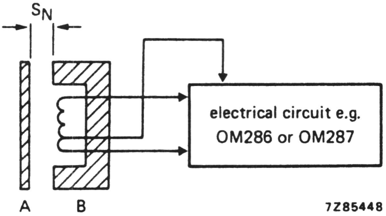
P–cores for proximity switches

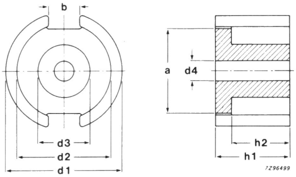
For detailed information on these and other types see Data Handbook C4/C5

An inductive proximity detector operates as follows. A metal object, A approaches– or recedes from an open potcore half with coil, B. The change in the Q of the oscillator is used to generate an electrical signal that can be used to drive an electromechanical relay, an audible alarm or similar devices.

Potcore halves with diameters up to9.4 mm are manufactured in Ferroxcube grade 3D3 and potcore halves with diameters 14 mm and larger, in Ferroxcube 3H1. This is because the operating frequency of oscillators with small potcore halves is higher than that of oscillators with large potcore halves.

Suitable coil formers are available for all potcore halves. The polycarbonate material of the coilformer limits the maximum potting temperature to 110°C. The potting material should be somewhat flexible to avoid high mechanical stress on the Ferroxcube potcore halves.



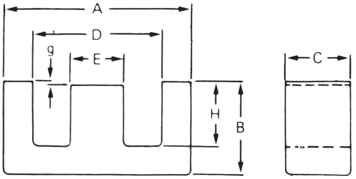


type	dimensions (mm)							
	d1	d2	d3	d4	h1	h2	a	b
PH 5.6/3.6	5.75	4.5	2.5	0.95	3.6	2.8	4	1.5
PH 7.4/3.9	7.4	5.8	3	1.38	3.95	2.8	5.7	1.6
PH 9.4/4.8	9.4	7.5	3.9	2	4.8	3.55	6.5	2
PH 14/7.5	14.4	11.6	6	3	7.5	6	9.5	3.3
PH 26/9.2	25.5	21.2	11.5	5.4	9.2	6.4	18	3.8

potcore half	mat. grade	cat. number potcore halves	cat. number coil former
PH5.6/3.6	3D3	**4322 020 54210**	**4322 021 33540**
PH7.4/3.9	3D3	**4322 020 54510**	**4322 021 32990**
PH9.4/4.8	3D3	**4322 020 54710**	**4322 021 31700**
PH14/7.5	3H1	**4322 020 54800**	**4322 021 30250**
PH26/9.2	3H1	**4322 020 54900**	**4322 021 33700**

For detailed information on these and other types see Data Handbook C4/C5

E–cores are standardized to DIN 41295. They are used in a multitude of applications as power transformers or chokes. EF–cores have been dimensionally optimized for the use of ferrite, where E–cores have the same dimensions as metal lamination cores. We offer an extensive range in 3C8, 3C85, 3F3 and 3C11. For gapped cores see handbook C4/C5.

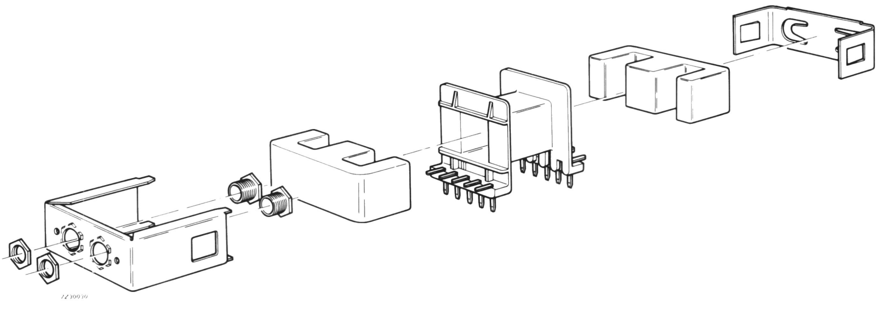


type	dimensions (mm)						magnetic parameters for a set of cores		
	A max	B max	C max	D min	E min	H min	Ve mm^3	Ae mm^2	le mm
E20/10/5	20.7	10.2	5.3	12.8	4.8	6.3	1340	31.2	42.8
E25/13/7	25.8	12.8	7.5	17.5	7.2	8.7	3160	55	57.5
E30/15/7	30.8	15.2	7.3	19.5	6.7	9.7	4000	59.7	66.9
E42/21/15	43.0	21.2	15.2	29.5	11.7	14.8	17600	182	97
E42/21/20	43.0	21.2	20.0	29.5	11.7	14.8	23100	236	98
E55/28/21	56.2	27.8	21.0	37.5	16.7	18.5	43700	354	123
E65/33/27	66.5	32.8	27.4	44.2	19.3	22.2	78200	532	147
EF12.6	13.1	6.5	3.7	8.9	3.4	4.5	384	13	29.6
EF16	17.3	8.2	4.7	11.3	4.4	5.7	754	20.1	29.6
EF20	20.4	10.2	5.9	14.1	5.5	7.0	1500	33.5	44.9
EF25	25.8	12.8	7.5	17.5	7.0	8.7	3020	52.5	57.5
EF32	32.9	16.4	9.5	22.7	8.9	11.2	6180	83	74

type	material grade			
	3C8	3C85	3F3	3C11
E20/10/5	**4312 020 24070**			**4312 020 35970**
E25/13/7	**4312 020 34020**			**4312 020 35620**
E30/15/7	**4312 020 34550**			**4312 020 35080**
E42/21/15	**4312 020 34110**	**4312 020 35640**		**4312 020 35980**
E42/21/20	**4312 020 34120**	**4312 020 35650**		
E55/28/21	**4312 020 34100**	**4312 020 35910**		
E65/33/27	**4312 020 34380**			
EF12.6	**4312 020 34470**			
EF16	**4312 020 35550**			
EF20	**4312 020 35040**			**4312 020 35560**
EF25	**4312 020 34020**			**4312 020 35620**
EF32	**4312 020 35400**			**4312 020 34930**

Accessories for E-cores

For detailed information on these and other types see Data Handbook C4/C5



Coil formers and mounting parts for E-cores

E-core type	catalogue number coil formers			catalogue number mounting parts	
		with pins			
	without pins	horizontal mounting	vertical mounting	clasp	spring
E20/10/5	**4312 021 28430**	**4322 021 20240**	**4322 021 20290**	**4322 021 20160**	**4322 021 20220**
E25/13/7	–	**4312 021 28750**	**4312 021 28540**	**4312 021 26120**	**4312 021 26190**
E30/15/7	**4312 021 28550**	**4322 021 20250**	–	**4322 021 20170**	**4322 021 20230**
E42/21/15	**4312 021 28620**	**4322 021 31830**	–	**4322 021 31910**	**4322 021 31920**
E55/28/21	**4312 021 28710**	–	–	**4312 021 26090***	**4312 021 26130***
E65/32/27	**4312 021 28720**	–	–	**4312 021 26110***	**4312 021 26140***

fixing•bush	4322 021 30720
nut	4322 021 30710

* Clasp and spring will be delivered as a set

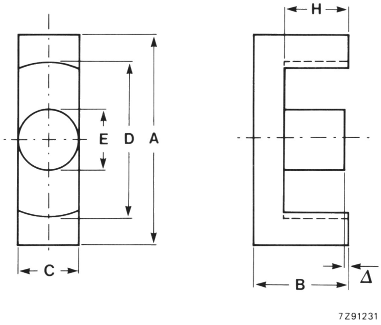
ETD–cores

For detailed information on these and other types see Data Handbook C4/C5

The ETD–series of high frequency power cores in Ferroxcube 3C8, 3C85 and 3F3 ferrite has been optimized to meet the current requirements of switched–mode power supplies.

Features

- Round centre pole for minimum conductor length.
- Maximum throughput power in the frequency range 20 to 500 kHz.
- Minimum core weight due to constant cross–sectional area proper choice of transition frequency.
- Winding breadth sufficient for full IEC mains isolation in specified configurations.
- Sufficient winding height for minimum loss windings.



type	dimensions (mm) A max	B max	C max	D min	E min	H min	magnetic dimensions Ve	Ae	le
ETD29/16/10	30.6	16	9.8	22	9.8	11.3	5470	76	72
ETD34/17/11	35	17.5	11.1	25.6	11.1	11.8	7640	97.1	78.6
ETD39/20/13	40	20	12.8	29.3	12.8	14.2	11500	125	92.2
ETD44/22/15	45	22.5	15.2	32.5	15.2	16.1	17800	173	103
ETD49/25/16	49.8	24.9	16.7	36.1	16.7	17.7	24000	211	114

Range of ungapped core halves

type	material grade 3C8	3C85	3F3
ETD29/16/10		**4312 020 37500**	
ETD34/17/11	**4312 020 37000**	**4312 020 37200**	
ETD39/20/13	**4312 020 37050**	**4312 020 37250**	
ETD44/22/15	**4312 020 37100**	**4312 020 37300**	
ETD49/25/16	**4312 020 37150**	**4312 020 37350**	

Ungapped core sets are also available (see handbook C4/C5).

Accessories for ETD–cores

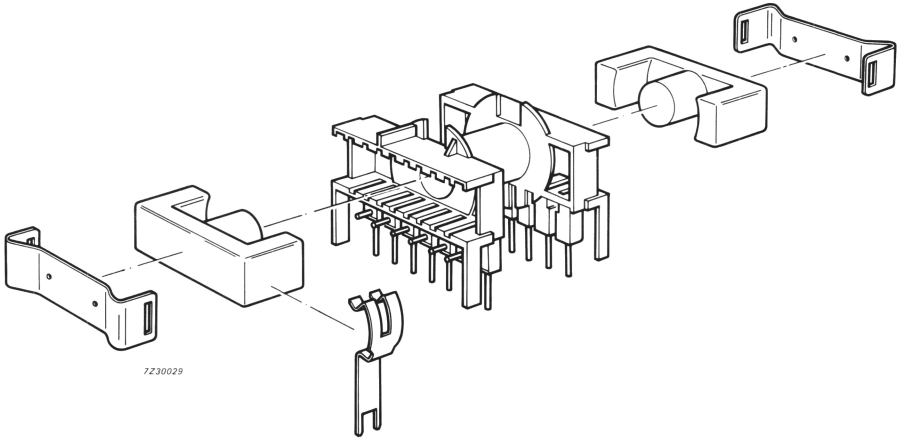
For detailed information on these and other types see Data Handbook C4/C5

Coil formers and clips

The PBTP coil former is suitable for single spindle or automatic machine winding.
It is terminated after winding, to integral pins. The two cores are assembled to the coil former in one operation, as shown in figure below.

Two stainless steel clips retain the cores in the coil former assembly, maintaining adequate pressure at the mating pole faces.

The complete assembly is suitable for mounting on a printed–wiring board.



Coilformer material PBTP (UL94 – Vo, yellow card, number E45 329–M).
Clip material: stainless steel

type	coilformer		clip cat. number	earth clip cat. number
	no. of pins	cat. number		
ETD29/16/10		**4322 021 34380**	**4322 021 34370**	
ETD34/17/11	14	**4322 021 33850**	**4322 021 33890**	**4322 021 33940**
ETD39/20/13	16	**4322 021 33860**	**4322 021 33900**	**4322 021 33950**
ETD44/22/15	18	**4322 021 33870**	**4322 021 33910**	**4322 021 33960**
ETD49/25/16	20	**4322 021 33880**	**4322 021 33920**	**4322 021 33970**

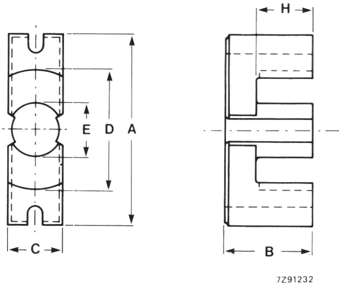
Double (coaxial) coilformers for ETD34, fulfilling mains insulation requirements in flame retarding phenolformaldehyde (UL94 – Vo, yellow card number E63312–M).
Coilformer half for primary winding: 4322 021 34230
Coilformer half for secondary winding: 4322 021 34240

EC–cores and accessories

For detailed information on these and other types see Data Handbook C4/C5

EC–cores have a round centre pole to make strip winding easy, and ensuring a high copper factor and low leakage inductance; they meet the IEC65 standards for creepage distance (2 x 4 mm) and clearance between terminal pins and core.

	dimensions (mm)						magnetic parameters		
type	A max	B max	C max	D min	E min	H min	Ve mm^3	Ae mm^2	le mm
EC35/17/10	35.3	17.45	9.8	22.2	9.8	11.9	6530	84.3	77.4
EC41/19/12	41.6	19.65	11.9	26.3	11.9	13.5	10800	121	89.3
EC52/24/14	53.5	24.35	13.75	32.1	13.75	15.5	18800	180	105
EC70/34/17	71.7	34.65	16.8	43.3	16.8	22.3	40100	279	144



Range of ungapped core halves

	material grade	
type	3C8	3C85
EC35/17/10	**4322 020 52500**	
EC41/19/12	**4322 020 52510**	
EC52/19/14	**4322 020 52520**	
EC70/34/17	**4322 020 52530**	

Accessories

	coil former				mounting parts (set)
type	coil former cat.no. **4322 021**	no. of tags	mounting horizontal or vertical	cat. no. of tags **4322 021**	cat. no. of set **4312 021**
EC35/17/10	**33410**	11	H	–	**26010**
	33310	13	H		
EC41/19/12	**33010**	–	–	33060	**26020** without mounting stud **26030** with mounting stud
	33320	9	H		
	33350	9	V		
	33480	12	H		
	33490	21	H + V		
EC52/24/14	**33020**	–	–	33070	**26040** without mounting stud **26050** with mounting stud
	33330	11	H		
	33360	11	V		
	33500	14	H		
EC70/34/17	**33030**	–	–	33070	**26060** without mounting stud **26070** with mounting stud
	33340	15	H		
	33370	15	V		

Coilformer of flame retarding PBTP (UL94 – Vo, yellow card number E45 329–M).

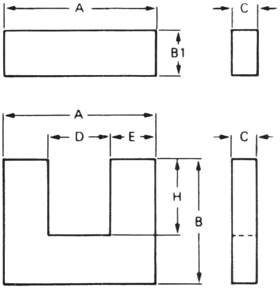
For detailed information on these and other types see Data Handbook C4/C5

U10, U15, U20, U25, U30
I15, I20, I25

These U–cores are for use in power supplies. Their excellent magnetic and electrical properties make them the designer's choice for small, light weight and highly efficient power supplies. U–cores are ideal in suppression applications. In case of pre–magnetisation, the influence of d.c. on the inductance of the choke can be reduced by using U–cores in combination with spacers to get an airgap.

U–I93, U–I100

High power to several kilowatts? Simple. Just stack up several U–cores into one big E–core with a square centre leg, or use UI and UU combinations. The result: low losses and high efficiency without weight penalty.



type	dimensions (mm)							magnetic parameters for a set of cores		
	A max	B max	B1 max	C max	D min	E min	H min	Ve mm^3	Ae mm^2	le mm
U10/8/3	10.2	8.2	–	3.0	4.05	2.75	5.0	331	8.6	38.4
U15/11/6	15.9	11.65	–	6.65	5	4.8	5.75	1440	30	48
U20/16/7	21.6	15.8	–	7.75	6	7.2	8	3800	56	68
U25/20/13	25.5	20	–	13.0	8	8	11	8600	100	86
U30/25/16	32	25.5	–	16.5	10	9.8	14.5	17400	157	111
U93/52/30	94.8	52.5	–	30.6	36.2	28	23.55	200000	780	254
I93/28/30	94.8		28	30.6						
U93/76/16	94.8	76.5	–	16.5	36.2	28	47.1	147000	450	350
I93/28/16	94.8		28	30.6						
U93/76/30	94.8	76.5	–	30.6	36.2	28	47.15	273000	780	350
U100/57/25	103.6	57.5	–	26.2	47	24.6	30.3	186000	620	300
I100/25/25	103.6	–	26.2	26.2						
I15/2/3	15.3	–	2.9	2.9						
I20/6/5	20.1	–	6.55	5.3						
I25/7/7	25.5	–	7.75	7.75						

For detailed information on these and other types see Data Handbook C4/C5

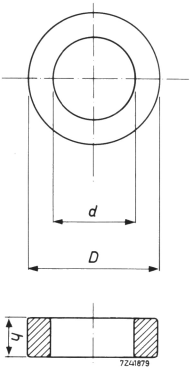
Ordering code for core range and accessories

	material grade		
type	3C8	3C11	coilformer
U10/8/3	**3122 134 91160**		**4322 021 35701**
U15/11/6	**3122 134 90690**		**3122 134 02540**
U20/16/7	**4312 020 33510**		**3122 137 64140**
U25/20/13	**3122 134 90460**		**3122 137 61910**
U30/25/16	**3122 134 90760**		**3122 137 55360**
U93/52/30	**4312 020 33580**		–
U93/76/30	**4312 020 33570**		–
U93/76/16	**4312 020 33550**		–
U100/57/25	**4312 020 33600**		–
I15/3/3	**3122 134 90730**		**3122 134 02590**
I20/6/5	**3122 134 90720**		**3122 134 02540**
I25/7/7	**3122 134 90620**		**3122 137 64140**
I93/28/16	**4312 020 33560**		–
I93/28/30	**4312 020 33590**		–
I100/28/25	**4312 020 33610**		–

Ring cores

For detailed information on these and other types see Data Handbook C4/C5

Ring cores are widely used for pulse and broad band transformers. In the field of RFI–suppression an important application is as a current compensated choke.
When used as a power transformer the main advantages are the long winding length and the very weak stray field (3C85 and 3F3).
The special grade 3R1 ia a rectangular loop ferrite suitable for magnetic amplifiers and spike suppression.
Our extensive range of sizes includes types proposed in IEC 525 plus many other current sizes.
The ring cores are isolated with a coat of nylon 11 (0.1 – 0.3 mm) to give good HV – isolation between core and winding (1.5 – 2 kV).



Range of ring cores (4330 030 .....)

size of non–coated ring D x d x h	material grade and colour code						
	violet 4C65	pink 4A11	red 3C85	blue 3F3	white 3C11	orange 3E25	black 3R1
2.5 x 1.5 x 1.0*	34680	34350		37880		37060	
4 x 2.2 x 1.1	34690	34360		37890		37350	
4 x 2.2 x 1.6*	34700	34370		34780		37070	
6 x 4 x 2	97160**	34380		37900		37080	
6.3 x 3.8 x 2.5*	34790	34870		34970			
9 x 6 x 3	97170**	34390		37910		37090	37680
10 x 6 x 4*	34810	34880		34980	34500	34580	
12.5 x 7.5 x 5*		34400	37790	37920	34920	37100	
14 x 9 x 5	97180**	34410	37450	37930	37460	37110	37690
14 x 9 x 9		34420	37800	37940		37120	
16 x 9.6 x 6.3*		34430	37810	37950	37180	37130	
19 x 10.6 x 10			34910		37470	37340	
19 x 10.6 x 15			37480		37490	37140	
20 x 10 x 7*	34820		34470		34510	34950	
23 x 14 x 7	97190**	34440	37500	34990	37510	37160	37700
25 x 15 x 10*			34480	35000	34520	34500	
26 x 14.5 x 10			37830		37520	37170	
26 x 14.5 x 20			37840		37530	37540	
29 x 19 x 7.5			37850		37580		
31.5 x 19 x 12.5*			34490	35010	34530	34510	
36 x 23 x 10	34710		37860		37550		
36 x 23 x15*	97200**	34450	37870	35020	37560	34220	34310

* Proposed as European standard range
** 4322 020

Iron powder ring cores

For detailed information on these and other types see Data Handbook C4/C5

These ring cores are made from electrolytic iron mixed with a small amount of resin to prevent excessive eddy currents. Due to their high saturation flux density (more than 1500 mT) they are very suitable for output chokes carrying high DC currents. The cores are coated with nylon 11 (0.1 – 0.3 mm thickness to give good HV insulation between core and winding (2 kV).

Range of cores (4330 030 .....)

size excl. coating D x d x h	grade: μi: colour code:	2P40 40 ±10% dark yellow	2P50 50 + +10% dark blue	2P65 65 ±10% dark red	2P80 80 ±10% darg green	2P90 90 ±10% dark brown
7.5 x 4.1 x 3		**60010**	**60080**	**6150**	**60220**	**60290**
12.3 x 8 x 4.4		**60020**	**60090**	**60160**	**60230**	**60300**
17.1 x 9.8 x 4.4		**60030**	**60100**	**60170**	**60240**	**60310**
19.9 x 12.9 x 6		**60040**	**60110**	**60180**	**60250**	**60320**
23.5 x 14.6 x 7.5		**60050**	**60120**	**60190**	**60260**	**60330**
26.5 x 14.9 x 10.7		**60060**	**60130**	**60200**	**60270**	–
32.6 x 20.2 x 10.7		**60070**	**60140**	**60210**	**60280**	–

Rods

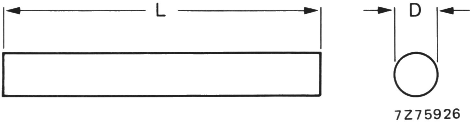
For detailed information on these and other types see Data Handbook C4/C5

Generally, ferrite rods are used as the core of solenoidal coils for two main applications:

- tuning: moving the core adjusts the coil to the required inductance value
- RFI–suppression: the inductance of the core is increased by the ferrite core

In cases where the RFI–suppression coil carries a high DC current the inductance will not be lowered much because the magnetic circuit is very open.

Curvature and mechanical tolerances of the standard range fullfil the requirements of DIN 41 291 or its equivalent IEC 233–1966.



Standard rod programme

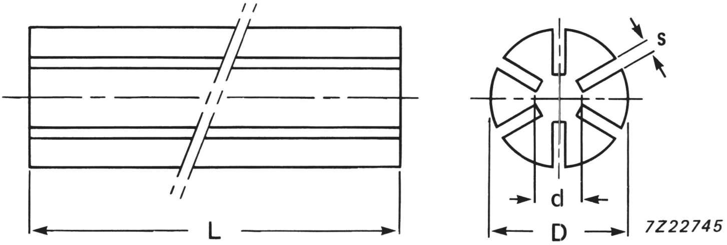
D diameter	tol. (–)	L length	tol.	6B1	3B1
2	0.05*	10	–0.6	**4330 030 40210**	**4330 030 31330**
2	0.05*	15	–0.8	**4330 030 40220**	**4330 030 31340**
2	0.05	20	–0.9	**4330 030 40540**	**4330 030 31450**
3	0.05	15	–0.8	**4330 030 40230**	**4330 030 31350**
3	0.05	20	–0.9	**4330 030 40240**	**4330 030 31360**
3	0.05	25	–1.0	**4330 030 40550**	**4330 030 31470**
4	0.05	15	–0.8	**4330 030 40250**	**4330 030 31370**
4	0.05	20	–0.9	**4330 030 40260**	**4330 030 31380**
4	0.05	25	–1.0	**4330 030 40560**	**4330 030 31490**
5	0.05	20	–0.9	**4330 030 40270**	**4330 030 31390**
5	0.05	25	–1.0	**4330 030 40280**	**4330 030 31400**
5	0.05	30	–1.2	**4330 030 40570**	**4330 030 31510**
6	0.10	30	–1.2	**4330 030 40290**	**4330 030 31410**
6	0.10	40	–1.6	**4330 030 40300**	**4330 030 31420**
6	0.10	50	±1.0	**4330 030 40580**	**4330 030 31530**
8	0.40	50	±1.0	**4330 030 40310**	**4330 030 31430**
8	0.40	150	±3.0	**4330 030 40320**	**4330 030 31440**
8	0.40	200	±4.0	**4330 030 40590**	**4330 030 31550**
10	0.50	200	±4.0	**4330 030 40600**	**4330 030 31460**

* middle class DIN 41 921

Impeder cores

For detailed information on these and other types see Data Handbook C4/C5

The features of a typical impeder core are high magnetic saturation flux density and low losses at the normal working conditions (commonly 100–500 kHz and 80–120°C). Slots in rods decrease the eddy current losses and have an additional cooling effect. Listed in the table are our preferred types.

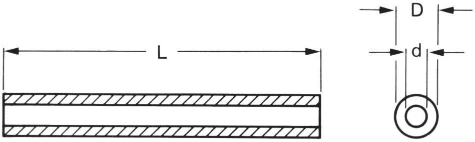


D	d	L	s	no. of slots	FXC grade	catalogue number
6 ±0.2	3	200 ±4	0.6	6	3D3	**4330 030 31190**
6 ±0.2	3	200 ±4	0.6	6	3C85	**4330 030 31210**
8 –0.5	3	125 ±3.75	0.6	6	3D3	**4330 030 30970**
8 ±0.5	3	200 ±4	0.6	6	3C85	**4330 030 31220**
10 –0.5	4.5	170 ±5	0.6	6	3D3	**4330 030 30990**
10 ±0.25	4.5	200 ±4	0.6	6	3C85	**4330 030 31230**
12 –0.7	5.5	170 ±5	0.7	8	3D3	**4330 030 31250**
12 ±0.35	5.5	200 ±4	0.7	8	3C85	**4330 030 31240**
14.3 –0.8	6.5	170 ±5	0.8	8	3D3	**4330 030 31200**
14.3 ±0.4	6.5	200 ±4	0.8	8	3C85	**4330 030 31260**

For detailed information on these and other types see Data Handbook C4/C5

Tubes can be used in solenoid coils to increase the inductance value. The effect is almost the same as with rods. In RFI applications tubes may also be shifted over wires. Because the magnetic flux path is then closed a steep increase in impedance will result. In such cases the sensitivity for DC currents however, may be rather high.

Curvature and mechanical tolerances of the standard range fullfil the requirements of DIN 41 291 or its equivalent IEC 233–1966.



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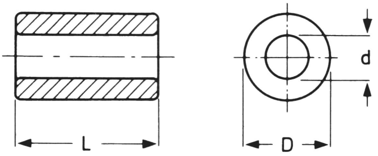
Standard rod programme

D O.D	tol. (–)	d I.D	tol. (+)	L	tol. (–)	6B1	3B1	3C85
3.5	0.25	1.2	0.15	5	0.3	**4330 030 40330**	**4330 030 33450**	**4330 030 33670**
3.5	0.25	1.2	0.15	15	0.8	**4330 030 40340**	**4330 030 33550**	**4330 030 33680**
4.0	0.25	1.6	0.15	15	0.8	**4330 030 40350**	**4330 030 33560**	**4330 030 33690**
4.0	0.25	1.6	0.15	40	1.6	**4330 030 40360**	**4330 030 33570**	**4330 030 33700**
5.0	0.30	2.0	0.20	15	0.8	**4330 030 40370**	**4330 030 33580**	**4330 030 33710**
5.0	0.30	2.0	0.20	50	±1	**4330 030 40380**	**4330 030 33590**	**4330 030 33720**
6.0	0.30	3.0	0.20	20	0.9	**4330 030 40390**	**4330 030 33600**	**4330 030 33730**
6.0	0.30	3.0	0.20	30	1.2	**4330 030 40400**	**4330 030 33610**	**4330 030 33740**
8.0	0.40	4.0	0.30	20	0.9	**4330 030 40410**	**4330 030 33620**	**4330 030 33750**
8.0	0.40	4.0	0.30	40	1.6	**4330 030 40420**	**4330 030 33630**	**4330 030 33760**
8.0	0.40	4.0	0.30	200	±4	**–**	**–**	**4330 030 33450**
10.0	0.50	4.2	0.30	20	0.9	**4330 030 40430**	**4330 030 33640**	**4330 030 33770**
10.0	0.50	4.2	0.30	45	1.8	**4330 030 40440**	**4330 030 33650**	**4330 030 33780**
10.0	0.50	5.0	0.40	200	±4	**–**	**–**	**4330 030 33460**
10.0	0.50	6.5	0.40	20	0.9	**4330 030 40450**	**4330 030 33660**	**4330 030 33791**

RFI--suppression beads

For detailed information on these and other types see Data Handbook C4/C5

Thread the beads onto leads of a domestic appliance, or even a diode in a TV power supply, and perhaps it's all you need to meet the requirements for interference suppression. Special grades of materials have been developed for this application: 3S1 and 4S2. Minimum bead impedances are guaranteed at the frequencies in the table below. Beads are listed according to their magnetic effectiveness which is calculated by the formula L. ln D/d.

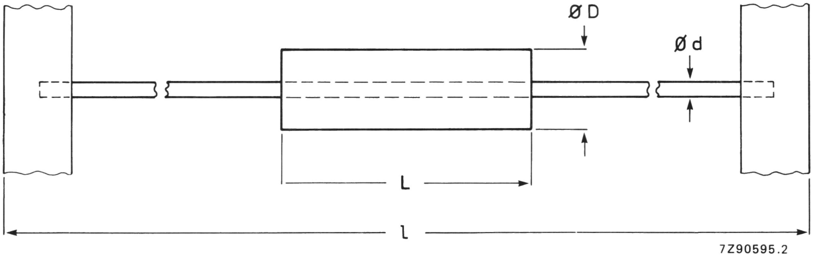


	frequency (MHz)							dimensions			
	1	3	10	30	100	300					
grade	$\|Z_S\|$ min. (Ω)						cat. number	D	d	L	L. ln(D/d)
3S1	10	18	24	20	17	15	**4330 030 32180**	5	2	4	3.3
	14	29	30	24	20	18	**4330 030 32120**	3	1	4	4.2
	10	20	32	26	22	20	**4330 030 32160**	5	1.5	4	4.5
	19	38	39	31	26	23	**4330 030 32100**	3	0.75	4	5.5
	27	52	53	42	36	32	**4330 030 32140**	5	0.75	4	7.2
	29	51	61	49	42	37	**4330 030 32190**	5	2	10	8.4
	33	72	73	58	50	44	**4330 030 32130**	3	1	10	10.5
	40	72	80	64	55	48	**4330 030 32170**	5	1.5	10	11.2
	58	95	97	77	66	58	**4330 030 32110**	3	0.75	10	13.2
	70	125	128	90	70	50	**4330 030 32150**	5	0.75	10	18.0
4S2	2	8	15	20	32	36	**4330 030 33150**	5	2	4	3.3
	2	8	15	22	34	38	**4330 030 33180**	8	3	4	3.8
	3	9	18	25	38	43	**4330 030 33120**	3	1	4	4.2
	3	10	20	27	41	47	**4330 030 33140**	5	1.5	4	4.5
	4	10	20	31	49	55	**4330 030 33170**	8	2	4	5.4
	2	8	22	32	50	54	**4330 030 33110**	3	0.75	4	5.5
	4	14	27	38	57	65	**4330 030 33160**	8	1.5	4	6.5
	5	15	30	44	68	77	**4330 030 33130**	5	0.75	4	7.2
	6	15	30	51	80	89	**4330 030 33190**	5	2	10	8.4
	6	20	40	55	85	95	**4330 030 33200**	8	3	10	9.5
	7	23	43	61	95	107	**4330 030 33210**	3	1	10	10.5
	7	25	45	68	104	116	**4330 030 33220**	5	1.5	10	11.2
	9	28	55	787	121	134	**4330 030 33230**	8	2	10	13.4
	9	30	55	81	125	135	**4330 030 33240**	3	0.75	10	13.2
	10	34	70	93	145	161	**4330 030 33250**	8	1.5	10	16.3
	12	40	75	110	170	190	**4330 030 33260**	5	0.75	10	18.0

RFI–suppression beads on wire

For detailed information on these and other types see Data Handbook C4/C5

Beads on wire are very suitable for suppressing unwanted signals between parts of a PC–board. They consist of a suppression bead fixed on a length of wire taped on a bandolier which will fit most commonly used automatic mounting machines.



	frequency (MHz)							dimensions				
	1	3	10	30	100	300						
grade	$\lvert Z \rvert$ min. (Ω)						cat. number	D	d	L	l	tape standard
3S1	70	125	128	90	70	50	**4330 030 33330**	4.9	10	64.4	0.64	IEC 286 part 1 and EIA–RS–296–D
3S2	5	18	48	70	80	65	**4330 030 38100**	3.5	6	75.0	0.60	
3D3	11	36	100	130	80	60	**4330 030 38110**	4.0	11	75.0	0.60	
4S2	4	13	26	39	60	70	**4330 030 38730**	3.5	4.45	64.4	0.64	
4S2	5	17	35	53	80	95	**4330 030 38740**	3.5	6.0	64.4	0.64	
4S2	6	20	39	59	88	105	**4330 030 38750**	3.5	6.7	64.4	0.64	
4S2	7	22	44	67	105	120	**4330 030 38760**	3.5	7.6	64.4	0.64	
4S2	8	26	52	78	117	140	**4330 030 38770**	3.5	8.9	64.4	0.64	
4S2	3	10	19	29	46	52	**4330 030 38810**	3.5	3.25	64.4	0.64	

Multi–hole tubes

For detailed information on these and other types see Data Handbook C4/C5

Multi–hole tubes are used for small HF transformers for voltage or impedance matching in TV, communications, data transmission, instrumentation and similar applications.

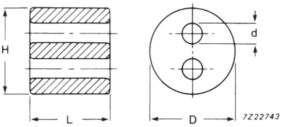


Fig. 1

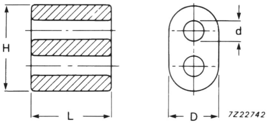


Fig. 2

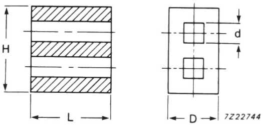


Fig. 3

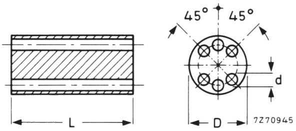


Fig. 4

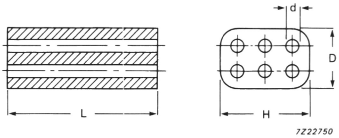


Fig. 5

fig.	D mm	d mm	L mm	H mm	grade	cat. number
1	5.6 ±0.25	0.95 ±0.15	4.5 −0.5	–	4D1	**3122 134 90800**
	5.6 ±0.15	1.5 ±0.15	12 ±0.2	–	4B1	**4330 030 32740**
	5.9 −0.6	0.75 +0.3	12.4 −0.8	–	4B1	**3122 104 90960**
	6.6 −0.6	1.05 +0.3	5 ±0.2	–	4B1	**3122 104 94840**
2	8.5 −0.5	3.5 +0.5	8 ±0.3	14 +0.5	4B1	**4312 020 31570**
	8.5 −0.5	3.5 +0.5	14 ±0.4	14 +0.5	4B1	**4312 020 31520**
2*	8 ±0.3	3 ± 0.3	6 ±0.3	13 ±0.3	4B1	**4313 020 40030**
	8 ±0.3	3 ± 0.3	6 ±0.3	13 ±0.3	3C85	**4313 020 40050**
3	5.4 ±0.3	2 ±0.3	10.9 ±0.3	10.8 ±0.3	4A11	**4313 020 20570**
	5.4 ±0.3	2 ±0.3	10.9 ±0.3	10.8 ±0.3	3C85	**4313 020 20800**

* chamfer in holes and sides

fig.	D mm	d mm	L mm	grade	cat. number
4	6 ±0.3	0.7 +0.2	10 ±0.5	3B1	**4312 020 31500**
	6 ±0.3	0.7 +0.2	10 ±0.5	4B1	**4312 020 31550**

fig.	D mm	d mm	H mm	L mm	grade	cat. number
5	4 ±0.2	0.7 ±0.3	6.1 ±0.3	10 ±0.5	3B1	**4312 020 31530**

For detailed information on these and other types see Data Handbook C4/C5

Wide band HF chokes are used for interference suppression, e.g. in electric motors. Double chokes are used for twin leads, in which case the advantage of mutual inductance can be utilized.

The chokes can be supplied with six axial holes through which 1.5, 2.5, or 2 x 1.5 (double chokes) turns of tinned copper wire are threaded.

The solderability of the leads is determined by the test TA, method 1 and ageing time as described in IEC 68–2–28.

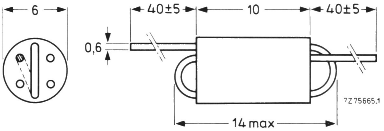


Fig. 1

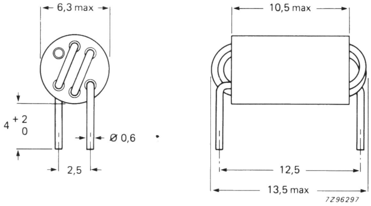


Fig. 2

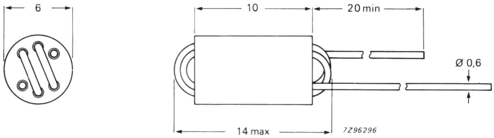


Fig. 3

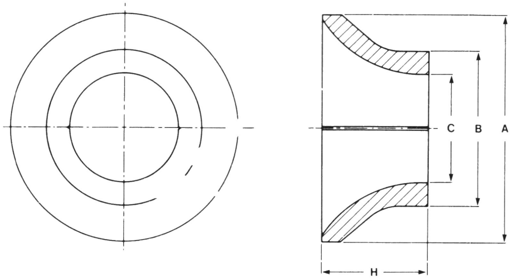
number of turns	Z_{max} Ω	f at Z_{max} MHz	optimal frequency range MHz	grade	catalogue number
1.5	⩾300	120	10–300	3B1	**4312 020 36630**
1.5	⩾350	250	80–300	4B1	**4312 020 36690**
2.5	⩾600	50	10–200	3B1	**4312 020 36640**
2.5	⩾700	180	50–300	4B1	**4312 020 36700**
2 x 1.5	⩾700	50	10–220	3B1	**4312 020 36650**
2 x 1.5	⩾800	110	50–300	4B1	**4312 020 36710**

number of turns	fig.	grade	catalogue number
2.5	2	3B1	**4330 030 38080**
3	3	3B1	**4312 020 36760**
2.5	2	3B1	**4330 030 38960***
2.5	2	3B1	**4330 030 38990****

* with enamelled wire, pre–soldered

** with isolated body

For detailed information on these and other types see Data Handbook C5



status = C

application	grade	mass g	dimensions in mm A	B	C	H	catalogue number
B/W							
90° (tiny vision)	2A2	62	47	37	29	26	**3122 134 91680**
110°	2A2	135	56.3	58	39.5	27.5	**3122 134 91940**
110°	3C2	135	56.3	58	39.5	26	**3122 104 93840**
110°	3C2	215	79	54	–	37	**3122 134 90750**
110° (tiny vision)	3C2	90	57	–	30.6	26.5	**4313 020 35380**
	3C2	196	74	54	38	37	**4322 020 35070**
90°	3C2	112	63	50	38	32	**3122 134 90600**
Data graphic display	3C2	364	94	58	46	54	**3122 134 92030**
Colour							
90°	2A2	235	92	60	48	46.5	**3122 134 91610**
90°	2A2	153	74	52	40	37	**3122 134 92510**
90° (39SW)	2A2	228	92	60	48	42	**3122 134 92600**
90° (51FS)	2A2	235	89	60	46.5	42	**3122 134 92780**
90° (36FS)	2A2	157	76	52	40	33	**3122 134 93050**
90°	2A2	268	84	60	48	42	**3122 134 91440**
90° (39SW)	2A2	225	92	66	51	36	**3122 134 99370**
110° (30AX)	3C2	505	138	73.5	60	57.6	**3122 134 92500**
110° (45AX)	3C2	367	113	65.5	49.5	44.8	**3122 134 92750**
Data graphic display	3C2	285	92	64.2	52	48	**3122 134 92590**
Data graphic display	3C2	760	132	–	51	87	**3122 134 91850**

Shapes and applications

For detailed information see Data Handbook C16

Rare earth magnets and Ferroxdure are among the most advanced permanent magnet materials available today. Magnets are made from these materials in a vast range of shapes and sizes, and the cost/weight/performance factor is excellent. Properly used, the strength of these magnets will remain practically unchanged throughout an indefinite lifetime. They are used mostly to transduce energy from one form to another, or to exert a force. This catalogue contains only a small selection of what is already being done: much more is possible.

Energy transduction

- **Electrical/mechanical**: in motors, meters, loudspeakers, beam deflectors, mass spectrometers
- **Mechanical/electrical**: in generators, alternators, dynamos, microphones, pick–ups
- **Mechanical/heat**: in hysteresis/torque and eddy–current instruments

Force exertion

- **On a magnetic material**: in attraction, repulsion, holding, lifting
- **On a moving electrical charge**: in magnetrons, klystrons, image intensifiers

Materials and shapes

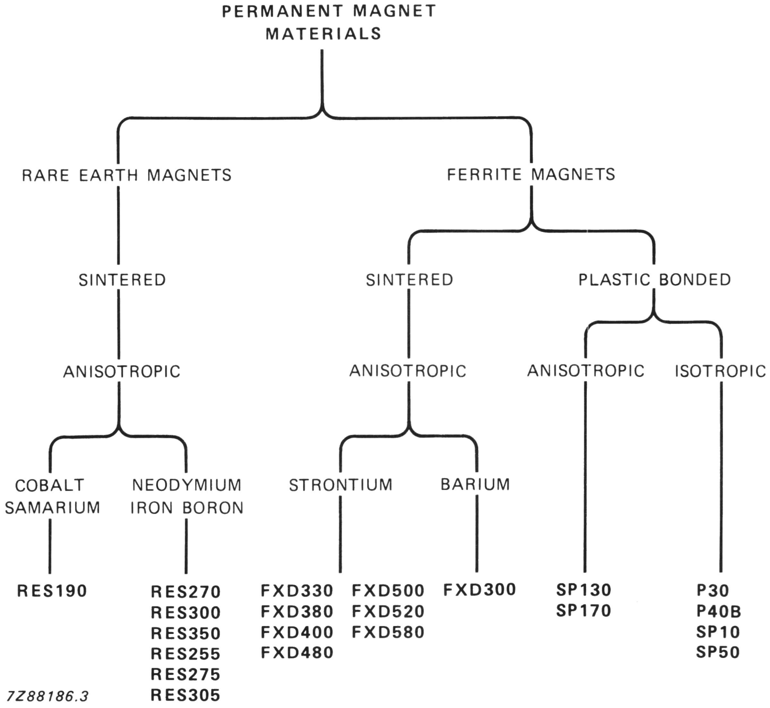
- **Anisotropic ceramic Ferroxdure**
  (see Data Handbook C16 for type list)
  segments: in motors, magnetos
  rings: in loudspeakers, motors, magnetos
  disc and blocks: in metal seperators, chucks, clamping rings

- **Anisotropic plastic–bonded Ferroxdure**
  (see Data Handbook C16 for type list)
  wide range of shapes

- **Isotropic plastic–bonded Ferroxdure**
  (see Data Handbook C16 for type list)
  wide range of shapes: where flexible products and/or complex magnetizing patterns are required

- **Anisotropic sintered rare earth magnets**
  (see Data Handbook C16 for type list)
  blocks, slugs, segments: in applications requiring highest magnetic energies

For detailed information see Data Handbook C16


PERMANENT MAGNET MATERIALS
RARE EARTH MAGNETS
FERRITE MAGNETS
SINTERED
SINTERED
PLASTIC BONDED
ANISOTROPIC
ANISOTROPIC
ANISOTROPIC
ISOTROPIC
COBALT SAMARIUM
NEODYMIUM IRON BORON
STRONTIUM
BARIUM
RES190
RES270
RES300
RES350
RES255
RES275
RES305
FXD330
FXD380
FXD400
FXD480
FXD500
FXD520
FXD580
FXD300
SP130
SP170
P30
P40B
SP10
SP50
7Z88186.3

For detailed information see Data Handbook C16

Ferroxdure (sintered)
Anisotropic

material designation	remanence B_r (mT) typ – min	coercivity H_cB (kA/m) typ – min	polarization coercivity H_cJ (kA/m) typ – min	maximum BH product $(BH)_{max}$ (kJ/m^3) typ – min	B_r x H_cJ (kJ/m^3) typ – min
FXD330	370 – 360	245 – 230	255 – 240	25.5 – 24.1	94 – 86
FXD380	390 – 380	265 – 250	275 – 260	28.8 – 26.9	107 – 99
FXD480	380 – 370	280 – 270	320 – 305	26.8 – 25.5	122 – 113
FXD580	385 – 375	285 – 280	360 – 350	29.8 – 28.3	139 – 131
FXD300	400 – 390	160 – 145	165 – 150	29.5 – 28.0	66 – 59
FXD400	410 – 400	265 – 250	275 – 260	31.3 – 29.8	113 – 104
FXD500*	405 – 400	295 – 285	320 – 310	30.5 – 29.8	130 – 124
FXD520	425 – 420	250 – 240	260 – 250	33.6 – 32.8	111 – 105

Ferroxdure (plastic bonded)
Isotropic

material designation	remanence B_r (mT) typ – min	coercivity H_cB (kA/m) typ – min	polarization coercivity H_cJ (kA/m) typ – min	maximum BH product $(BH)_{max}$ (kJ/m^3) typ – min	B_r x H_cJ (kJ/m^3) typ – min
FXD SP10	80 – 75	58 – 54	190 –	0.9 – 0.8	
FXD P30	125 – 115	88 – 84	190 –	2.8 – 2.4	
FXD P40B	145 – 135	96 – 88	190 –	3.6 – 3.2	
FXD SP50	155 – 150	104 – 100	190 –	4.4 – 4	

Anisotropic

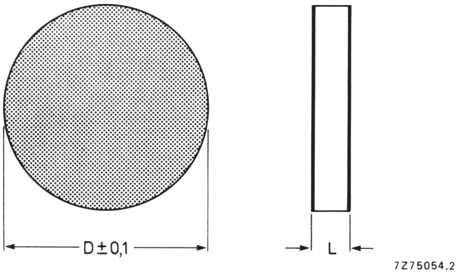
material designation	remanence B_r (mT) typ – min	coercivity H_cB (kA/m) typ – min	polarization coercivity H_cJ (kA/m) typ – min	maximum BH product $(BH)_{max}$ (kJ/m^3) typ – min	B_r x H_cJ (kJ/m^3) typ – min
FXD SP130	240 – 230	175 – 167	240 –	11 – 10	
FXD SP170	270 – 260	190 – 185	220 –	–	

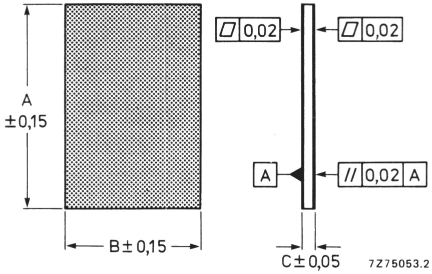
Rare earth (sintered)
Anisotropic

material designation	remanence B_r (mT) typ – min	coercivity H_cB (kA/m) typ – min	polarization coercivity H_cJ (kA/m) typ – min	maximum BH product $(BH)_{max}$ (kJ/m^3) typ – min	B_r x H_cJ (kJ/m^3) typ – min
RES 190	890 – 870	670 – 620	– 1100	154 – 144	
RES 270	1100 – 1050	700 – 650	1000 – 750	215 –	
RES 300	1150 – 1100	750 – 700	1000 – 750	240 –	
RES 350	1200 – 1150	800 – 750	1000 – 750	280 –	
RES 255	1050 – 1000	750 – 700	1500 – 1200	200 –	
RES 275	1100 – 1050	800 – 750	1500 – 1200	215 –	
RES 305	1150 – 1100	850 – 800	1500 – 1200	240 –	

* Preliminary data

For detailed information on these and other types see Data Handbook C19





Discs, grade PXE 5

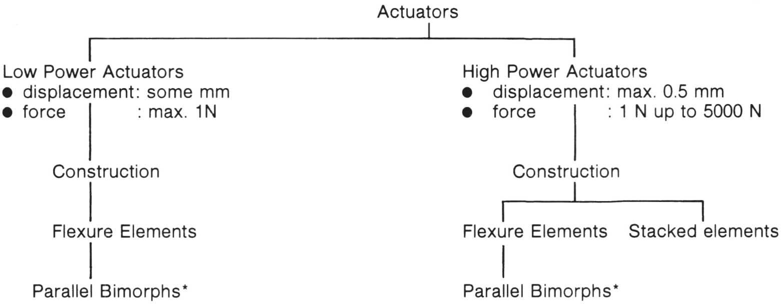
D mm	L mm	catalogue number
5.0	0.3	**4322 020 17500**
5.0	0.5	**4322 020 17510**
5.0	1,0	**4322 020 17520**
5.0	2,0	**4322 020 17530**
10.0	0.2	**4322 020 17540**
10.0	0.5	**4322 020 17550**
10.0	1.0	**4322 020 17560**
10.0	2.0	**4322 020 17570**
10.0	3.0	**4322 020 17580**
10.0	5.0	**4322 020 17590**
16.0	0.2	**4322 020 17600**
16.0	0.5	**4322 020 17610**
16.0	1.0	**4322 020 17620**
16.0	2.0	**4322 020 17630**
16.0	3.0	**4322 020 17640**
20.0	0.2	**4322 020 17650**
20.0	0.5	**4322 020 17660**
20.0	1.0	**4322 020 17670**
20.0	2.0	**4322 020 17680**
25.0	0.2	**4322 020 17690**
25.0	0.5	**4322 020 17700**
25.0	1.0	**4322 020 17710**
25.0	2.0	**4322 020 17720**

Plates, grade PXE 5

A mm	B mm	C mm	catalogue number
4	4	0.3	**4322 020 13500**
8	4	0.3	**4322 020 13520**
12	4	0.3	**4322 020 13540**
6	6	0.3	**4322 020 13550**
12	6	0.3	**4322 020 13580**
8	8	0.3	**4322 020 13590**
10	10	0.3	**4322 020 13620**
12	12	0.3	**4322 020 13640**
12	6	0.5	**4322 020 13650**
12	6	1.0	**4322 020 13660**

For detailed information on these and other types see Data Handbook C19

Actuators
Operating in the 31 or 33 mode below the resonant frequency, actuators transfer electrical energy into "large" displacements in comparison with the displacements of simple PXE transducers.


Actuators
Low Power Actuators
● displacement: some mm
● force : max. 1N
Construction
Flexure Elements
Parallel Bimorphs*
High Power Actuators
● displacement: max. 0.5 mm
● force : 1 N up to 5000 N
Construction
Flexure Elements
Stacked elements
Parallel Bimorphs*

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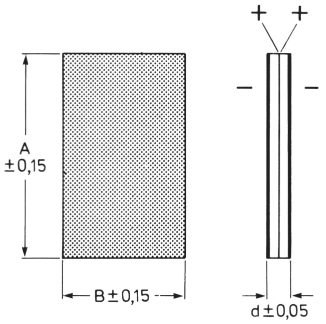
* series bimorph only as sensor

For detailed information on these and other types see Data Handbook C19



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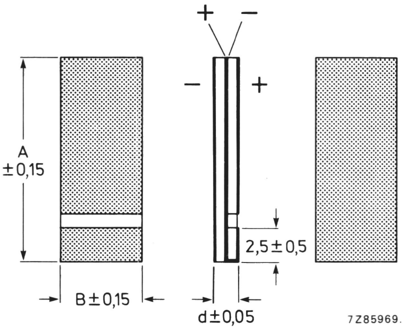

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Series Bimorph plates
Material: PXE 5

A mm	B mm	d mm	catalogue number
4	4	0.6	**4322 020 04570**
6	4	0.6	**4322 020 04580**
8	4	0.6	**4322 020 04590**
10	4	0.6	**4322 020 04600**
12	4	0.6	**4322 020 04610**
6	6	0.6	**4322 020 04620**
8	6	0.6	**4322 020 04630**
10	6	0.6	**4322 020 04640**
12	6	0.6	**4322 020 04650**
8	8	0.6	**4322 020 04660**
10	8	0.6	**4322 020 04670**
12	8	0.6	**4322 020 04680**
10	10	0.6	**4322 020 04690**
12	10	0.6	**4322 020 04700**
12	12	0.6	**4322 020 04710**
12.7	1.6	0.6	**4322 020 08250**
15.5	1.6	0.6	**4322 020 08240**
70	1.6	0.6	**4322 020 08230**

Parallel Bimorph plates
Material PXE5

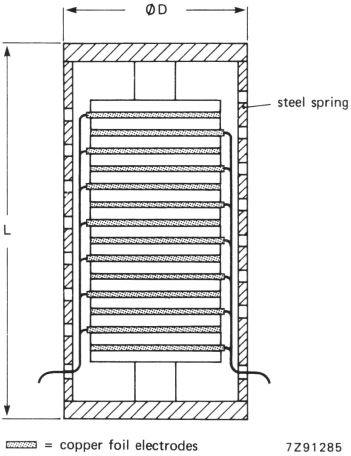
A mm	B mm	d mm	catalogue number
15	6	0.6	**4322 020 14530**
20	6	0.6	**4322 020 14540**
25	6	0.6	**4322 020 14550**
30	6	0.6	**4322 020 14560**
35	6	0.6	**4322 020 14570**
15	12	0.6	**4322 020 14580**
20	12	0.6	**4322 020 14590**
25	12	0.6	**4322 020 14600**
30	12	0.6	**4322 020 14610**
35	12	0.6	**4322 020 14620**

For detailed information on these and other types see Data Handbook C19

High–power actuators

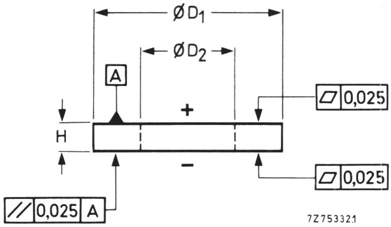
The high–power actuators produces in the 33 mode displacements far greater than those possible with simple PXE transducers operating in the 31 or 33 modes. It comprises a pile of PXE discs, held in compression with a force of about 1000 N by a cylindrical steel spring and interleaved with copper foil electrodes. The high compressive forces give the structure exceptional rigidity by eliminating all free play between the discs.

A voltage between the electrodes causes the discs to expand, stretching the cylindrical spring and producing an overall extension of the actuator. The actuator has a response time of around 200 µs.



catalogue number	**4322 020 19050**	**4322 020 19060**	**4322 020 19070**	
Dimensions D x L	16 x 50	22 x 75	32 x 100	mm
Stroke 0 to 500 V	≃20	≃30	≃50	µm
Stroke 0 to 800 V	≃35	≃50	≃80	µm
Capacitance at 25 °C	≃100	≃250	≃800	nF
Stiffness	≃30	≃50	≃80	N/µm
Max. applied force	2000	3000	5000	N

For detailed information on these and other types see Data Handbook C19



Rings for ultrasonic applications

Material: PXE 41

D_1 mm	D_2 mm	H mm	nom. capacitance pF	catalogue number
10	5	2	320	**4322 020 06060**
20	6	5	650	**4322 020 06170**

Material: PXE 41

D_1 mm	D_2 mm	H mm	nom. capacitance pF	catalogue number
20 ±0.5	6 ±0.3	5 ±0.1	650	**4322 020 06130**
38.1 ±0.6	12.7 ±0.35	4 ±0.1	2800	**4322 020 06090**
38.1 ±0.6	12,7 ±0.35	6,35 ±0.1	1800	**4322 020 06040**
50 ±1	20 ±0.5	6 ±0.1	3000	**4322 020 06050**

Material: PXE 43

D_1 mm	D_2 mm	H mm	nom. capacitance pF	catalogue number
20 ±0.5	6 ±0.3	5 ±0.1	500	**4322 020 06290**
25 ±0.6	10 ±0.3	5 ±0.1	725	**4322 020 06280**
38.1 ±0.6	12.7 ± 0.35	6,35 ±0.1	1400	**4322 020 06270**
50 ±1	20 ±0.5	5 ±0.1	2900	**4322 020 06150**
50 ±1	20 ±0.5	6 ±0.1	2400	**4322 020 06140**

Ferrites, CECC types

Products approved to the CECC (Cenelec Electronic Components Committee) harmonized system for electronic components of assessed quality

Ferrites

type	CECC detail specification
4322 022 25260	CECC 25 100–018
4322 022 67260	CECC 25 100–019

Introduction

Our Data Handbook System comprises more than 60 books with specifications on electronic components, subassemblies and materials. It is made up of six series of handbooks:

INTEGRATED CIRCUITS
DISCRETE SEMICONDUCTORS
DISPLAY COMPONENTS
PASSIVE COMPONENTS
PROFESSIONAL COMPONENTS
MATERIALS

The data handbooks contain all pertinent data available at the time of publication, and each is revised and reissued periodically.
When ratings or specifications differ from those published in the preceding edition they are indicated with arrows in the page margin. Where application information is given it is advisory and does not form part of the product specification.
Information on current Data Handbooks and on how to obtain a subscription for future issues is available from any of the Organizations listed on the back cover.
Product specialists are at your service and enquiries will be answered promptly.

DATA HANDBOOK SYSTEM

Integrated circuits

INTEGRATED CIRCUITS

This series of data handbooks comprises:

IC01	**Radio, audio and associated systems** Bipolar, MOS
IC02a/b	**Video and associated systems** Bipolar, MOS
IC03	**ICs for Telecom** Bipolar, MOS Subscriber sets, Cordless Telephones
IC04	**HE4000B logic family** CMOS
IC05	**not yet issued**
IC06	**High–speed CMOS; PC74HC/HCT/HCU** Logic family
IC07	**not yet issued**
IC08	**ECL 10K and 100K logic families**
IC09	**TTL logic series**
IC10	**Memories** MOS, TTL, ECL
IC11	**Linear Products**
IC12	**I^2C–bus compatible ICs**
IC13	**Semi–custom** Programmable Logic Devices (PLD)
IC14	**Microcontrollers** Bipolar, MOS
IC15	**FAST TTL logic series**
IC16	**CMOS integrated circuits for clocks and watches**
IC17	**ICs for Telecom** Bipolar, MOS Radio pagers, Mobile telephones, ISDN
IC18	**Microprocessors and peripherals**
IC19	**Data communication products**

PHILIPS

DISCRETE SEMICONDUCTORS

This series of data handbooks comprises:

current code	new code	handbook title
S1	**SC01**	**Diodes** High–voltage tripler units
S2a	**SC02**	**Power diodes**
S2b	**SC03**	**Thyristors and triacs**
S3	**SC04**	**Small–signal transistors**
S4a	**SC05**	**Low–frequency power transistors and hybrid IC power modules**
S4b	**SC06**	**High–voltage and switching power transistors**
S5	**SC07**	**Small–signal field–effect transistors**
S6*	**SC08** **SC09**	**RF power transistors** **RF power modules**
S7	**SC10**	**Surface mounted semiconductors**
S8a	**SC11**	**Light emitting diodes**
S8b	**SC12**	**Optocouplers**
S9	**SC13**	**PowerMOS transistors**
S10	**SC14**	**Wideband transistors and wideband hybrid IC modules**
S11	**SC15**	**Microwave transistors**
S15**	**SC16**	**Laser diodes**
S13	**SC17**	**Semiconductor sensors**
S14	**SC18**	**Liquid crystal displays and driver ICs for LCDs**

* The current handbook S6 will be divided into 2 handbooks (SC08 and SC09).

** New handbook in this series; will be issued shortly.

Display components

DISPLAY COMPONENTS

This series of data handbooks comprises:

cu–rent code	new code	handbook title
T8	**DC01**	**Colour display systems**
T16	**DC02**	**Monochrome tubes and deflection units**
C2	**DC03**	**Television tuners, coaxial aerial input assemblies**
C3	**DC04**	**Loudspeakers**
C20	**DC05**	**Wire–wound components for TVs and monitors**

PHILIPS

Passive components

PASSIVE COMPONENTS
This series of data handbooks comprises:

current code	new code	handbook title
C14	**PA01**	**Electrolytic capacitors; solid and non–solid**
C11	**PA02**	**Varistors, thermistors and sensors**
C12	**PA03**	**Potentiometers, encoders and switches**
C7	**PA04**	**Variable capacitors**
C22	**PA05**	**Film capacitors**
C15	**PA06**	**Ceramic capacitors**
C9	**PA07**	**Piezoelectric quartz devices**
C13	**PA08**	**Fixed resistors**

PROFESSIONAL COMPONENTS

This series of data handbooks comprises:

current code	new code	handbook title
T1	*	**Power tubes for RF heating and communications**
T2a	*	**Transmitting tubes for communications, glass types**
T2b	*	**Transmitting tubes for communications, ceramic types**
T3	**PC01**	**High–power klystrons**
T4	*	**Magnetrons for microwave heating**
T5	**PC02**	**Cathode–ray tubes**
T6	**PC03**	**Geiger–Müller tubes**
T9	**PC04**	**Photo and electron multipliers**
T10	**PC05**	**Plumbicon camera tubes and accessories**
T11	**PC06**	**Microwave diodes and sub–assemblies**
T12	**PC07**	**Vidicon and Newvicon camera tubes and deflection units**
T13	**PC08**	**Image intensifiers and infrared detectors**
T15	**PC09**	**Dry reed switches**
C8	**PC10**	**Variable mains transformers; annular fixed transformers**

* These handbooks will not be reissued.

MATERIALS

This series of data handbooks comprises:

current code	new code	handbook title
C4/C5	**MA01***	**Soft Ferrites**
C16	**MA02**	**Permanent magnet materials**
C19	**MA03**	**Piezoelectric ceramics**

* Handbooks C4 and C5 will be reissued as one handbook having the new code MA01.

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